TITLE:
Cobbs Creek Community Environmental Education Center

AUTHORS:
Knapp , Bruce ; Koch , Alyssa ; Springer , Brad ; Upham , Kim

KEYWORDS:
cobbs creek community , CCCEEC, environmental education, community center

CAE - 10

KABB Associates

Cobbs Creek Community Environmental Education Center

CAE-10

Bruce Knapp

Brad Springer

Alyssa Koch

Kim Upham

26 May 2000

1.0 INTRODUCTION

Cobbs Creek Community includes portions of West and Southwest Philadelphia, Overbrook, and eastern portions of Lower Merion Township. From the 1990 Census for Cobbs Creek, there are over 122,956 people living in this community, which is predominantly African American. There are over 7,522 students in the Cobbs Creek area. The community is involved in various organizations focused on improving the community.

One such community organization is the Cobbs Creek Community Environmental Education Center (CCCEEC) (Appendix I.A). The CCCEEC was started in 1991 by Mrs. Carole Chew Williams and her husband, former Senator Hardy Williams, who were interested in promoting environmental education to the Cobbs Creek youth and the community. The CCCEEC has implemented many programs which are listed in Appendix I.B that have enhanced the environmental education of students living in this area by bringing the programs to them.

2.0 PROBLEM

The CCCEEC's headquarters is currently at 4601 Market Street in a Penn State Extension Center. The center has been granted a permanent home at 63rd and Catherine Streets (Appendix II.B) by the Fairmount Park Commission. KABB Associates has been contacted by Mrs. Williams to design an environmental education center, which will also serve as a community center, in the Cobbs Creek Community. The challenge to KABB Associates is to create an educational center at this location using the existing building, providing additional structures and trails, that will provide the most utility for the CCCEEC. The building is to be multipurpose and will be used for various community functions.

2.1 Need for a Community Environmental Education Center

The introduction of a CCCEEC facility into the community will address many needs of this area that Mrs. Williams' identified when she founded the CCCEEC 10 years ago. Paramount is the great need for environmental education for inner city children living in the Cobbs Creek Area. There are environmental centers in the Philadelphia region, such as Pennypack

Environmental Center and the Andorra Nature Center but they are far enough away that Cobbs Creek residents wouldn't really go to there. Other nature or environmental centers in the area are the Morris Arboretum, Schuylkill Valley Nature Center, Awbury Arboretum, Tinicum National Environmental Center, and Bartram's Gardens but these centers are out of the way. There is an overwhelming need for a center to teach children and residents of the community about their own environment.

Children of this area need to realize that their own living area may have environmental problems. There is a need for hands on education to help the students become aware of these problem. Through experimentation, the children will be taught concepts to help them solve these problems which may also be used in future endeavors.

Another aspect of the center will be to provide professional career guidance for inner city children. Inner city children have few positive role models. Most children think of being doctors, nurses, lawyers or whatever their parents do when they grow up. Most do not associate the environment with a possible career. This center will allow children to explore "off beat" professions in the environment, such as a park ranger, environmental engineer, hydrologist, that may not have been presented to them before.

In addition to the educational needs, there is a need for large scale community involvement. When this project was introduced to the community at a meeting in November 1991, it received an overwhelming positive response from all present. This center is just one more way for the community to become closer knit and work towards something wonderful and of utmost importance to the future survival of the community--the education of the children. The construction of this center will allow for "hands on" community interaction, since it is our intention to have community members build the outdoor facilities. In this way, the residents will have put something into the center and the pride in the community will become stronger.

2.2 Goal of the CCCEEC

The goal of the Cobbs Creek Community Environmental Education Center, and our goal, is to provide a facility that will serve all members of the surrounding cultures, groups, and

communities. We hope to enhance environmental awareness and education through active participation in "hands on" activities at the facility. It is also our hope that the facility be used as a stepping-stone toward possible career opportunities in various environmentally related fields. We hope the facility will inspire all surrounding communities to take part in making the project successful by their involvement and participation.

2.3 Criteria

KABB Associates' design for the center is subjected to certain criteria, put forth by the CCCEEC, the community, and codes. It is also subject to certain constraints also put forth by the CCCEEC, the codes, and issues which have risen while progressing with the design. The major criteria is the budget limit of $2.1 million, raised by the CCCEEC, which has come from the William Penn Foundation, the City of Philadelphia and various other organizations. Also importantly by law, the facilities must take into consideration all individuals using them including handicapped persons. Various local and historical codes will determine exactly what is necessary to make the facilities handicapped accessible and to ensure that the building and outdoor facilities comply with all standards in this area. Another concern is the safety and security of all individuals using the center. With a caretaker on the premises twenty four hours a day, it is our hope that the community will feel safer and more secure in this area when using it at any time. The site must also be versatile since it will serve as an education center and as a community center. It is likely that this site will be the location of community picnics, flea markets, bazaars, concerts, and general gatherings. Another criterion is the desire to make this center a part of the environment and not an intrusion on it. The center is a learning tool and should be viewed as such. Local codes also require parking facilities which will be factored into the design.

In summary, the major criteria are cost, accessibility to handicapped persons, safety of individuals, local historical codes, versatility, and environmentally unobtrusive.

Requirements for the design of the facilities of the education center have been left in the hands of KABB Associates. However, CCCEEC has requested certain facilities, such as an educational trail and an amphitheater, be designed to increase the versatility of center.

3.0 SITE

The site is a 3.3 acre rectangle on 63rd Street at the intersection of 63rd and Catherine Streets (Appendix II.B). The site presents many characteristics that will provide a good base for analyzing environmental concerns. It encapsulates a portion of the Cobbs Creek, wetlands, woodlands, trails, and fields. The site is just a small portion of the much larger Cobbs Creek Park, which contains many communities, and is under the direction of the Fairmount Park Commission. It has an existing structure which sits at the bottom of a steep, west facing slope. There is a large open area on the west of the structure, which forms the flood plain of the creek. A steel bridge crosses the creek and allows access from both Philadelphia and Upper Darby. To the north and south of the building, there are trails which run parallel to 63rd Street and wind through the wooded area. One trail runs south to the Baltimore Avenue SEPTA station and the other runs north to Market Street. There is also a tree grove at the southern end of the site and a picnic area with tables near the north end of the site. A USGS map in Appendix II.A shows the site with these features.

4.0 EXISTING STRUCTURE

An old stable, property of the Fairmount Park Commission, has been donated to serve as the Cobbs Creek Community Environmental Education Center. The stable sits west of 63rd Street (Cobbs Creek Parkway) down in the Cobbs Creek Valley. The front of the stable faces west and is about 150 feet from the Cobbs Creek. A picture of the stable can be found in Appendix III.A.

4.1 Background

The two-story, stone stable with an area of approximately 8,750 square feet, was built in 1936 and is approximately 144 feet long and 30 feet wide. Atop the structure sits a steeply sloped slate roof. The interior structure consists mainly of wood. The layout plan consists of a

central bay with wings extending from both sides. The central bay is roughly ten feet wider than the wings. A single flight of stairs gives access to the upper level loft from the first level.

Since the initial construction, some renovations have taken place. In 1985, the Fairmount Park Commission equipped the stable with men's and women's lavatories, a staff office, and store rooms on the lower level to better serve the Riding Academy. In the past, this structure has served as a stable, riding academy, and police station for the City's Fairmount Park mounted police. Today, the building stands empty and boarded up.

4.2 Goals

This structure is intended to serve primarily as an environmental center and secondarily as a community center. To do so, the stable must be brought up to date with the appropriate electrical, plumbing, HVAC, lighting, fire protection, structural, and security systems. Since the function of this structure is to provide environmental education to area school children, it will include several classrooms, office space, meeting rooms, a laboratory, a multipurpose room, lavatories, janitor's closets, storage, and caretaker's quarters with kitchen and bathroom facilities. Various alternatives for the layout and systems have been considered and the best has been chosen.

4.3 Existing Conditions

A tour of the building enabled KABB Associates to see what renovations would be required and how rooms might be laid out. The interior is still configured as a stable with the stall posts still in place. We were not able to get into the north side of first floor because it was locked from the outside and there was no access from the inside. Although the current structural system is in good condition, it has been determined that the structure needs major overhauling to bring it up to a working environmental education center.

The exterior walls are constructed from stone and are approximately 18 inches thick while the walls around the central bay are approximately 9 inches thick. The building has a wooden frame which supports the roof and the floors. The first floor where the stalls are is a cobble

stone flooring. Some of these walls are load bearing and therefore will require care when they are altered to accommodate the new floor plan.

The second floor in the south wing is supported by a steel beam and wooden beam which run the length of the building. Three 5" steel columns support the steel beam and three more support the wood beam. These beams divide the span into thirds. Appendix III.A show the steel and wooden beams that are in the building.

Wooden floor joists measuring 3 inches by 10 inches, run from these beams and bear on the exterior stone walls. There are areas where these joists are in need of repair or replacement due to age and wear. One such area is the southwest corner where there is evidence of fire damage (Appendix III.A) Both the interior and exterior require cleaning to remove graffiti. The basement contains various tanks and pipes which had served the building in the past. The gas, electric, and water services are also located in the basement as seen in Appendix III.A. Appendix III.A shows the state of other areas of the building which are in need of repair.

The stall posts in the south wing shall be removed and the current cobblestone floor will be replaced with a six inch concrete slab reinforced with welded wire fabric. The staircase will be removed and replaced with two staircases for fire exits or other emergencies, as required by BOCA. The basement will be enlarged to contain all mechanical and electrical equipment and a door will be added to allow access to the basement from the outside.

4.4 Architecture

The architectural layout was dictated by our client's needs, the location of the utilities entering the building, attaining maximum space usage, and satisfying applicable codes (BOCA and historical). The final space allocation is found in the pie chart in Appendix III.B.3.

Rooms that our client requested were a multipurpose room, display areas, classroom, laboratory, meeting room, computer laboratory, offices, and a caretaker's apartment. A server room is located within the computer lab which will hold the main computer server and provide storage for computer supplies. This will have a locked door and a large window to view the students in the room.

BOCA dictated that a male and female lavatory be provided due to estimated occupancy and facility classification. For economical purposes, the rooms requiring plumbing were placed on the east side of the north wing where the existing water service enters the building. These rooms include the lavatories, janitor's closet, multipurpose room, caretaker's apartment, and laboratory.

The existing door on the west side of the central bay will serve as the main entrance because it is close to the proposed bus turn-around and parking area. Inside the main entrance there are two offices which will serve the ranger and/or guide and as a general information center. To comply with ADA requirements, an elevator will be installed. It will be located in the southeast corner of the central bay. This location was chosen because it is above the existing basement which will be used to hold the elevator pit and other equipment thus minimizing excavation costs. The remaining space within the central bay will be used as a display area for the various projects that the students will create. Sheets A-1, 2, & 3 in Appendix X show the proposed building layout.

The south wing of the building contains a meeting room and a general classroom on the first floor with a second meeting room and computer laboratory on the second floor. The north wing contains the lavatories, janitor's closet and a multipurpose room on the first floor with a general laboratory and caretaker's apartment (with bathroom and kitchen facilities) on the second floor. The rooms which will require the majority of the gas and plumbing needs are located in the north wing where the utilities enter the building, keeping the cost of piping to a minimum.

4.5 HVAC

Five HVAC systems were considered for this building. The variable air volume (VAV) system was chosen due to the variety of functions that will occur in the building thus requiring flexibility in the heating and cooling. A decision matrix is included in Appendix III.C.6.a. A VAV systems will allow for specific areas to be conditioned as needed. There will be three main zones. The first floor, zone one, will have continual occupancy due to the offices, meeting room, and lavatories. The second floor will be divided into two zones. One will contain the computer

lab and the other will contain the laboratory and the caretaker's apartment. These zones will allow individual control over these various spaces and result in a more economical operation.

The cooling load for the building is 243 tons per square foot. This requires a 35 ton cooling unit based on the structural construction, occupancy, and equipment. Calculations for overall heating and cooling can be found in Appendix III.C.1, C.2, and C.3. The unit that provides this cooling is 109 inches wide, 42 inches deep, and 85 inches high. The unit will be placed on the outside wall to allow for air intake. Appendix III.C.6 contains a spreadsheet from Carrier on the chosen unit. The basement space is adequate to house this unit.

Ductwork will consist of round ducts. The main duct will run up a chase in the northeast corner of the central bay with branches running the length of each wing on both floors. Runouts extend from these branches into the rooms. The duct layout is in Appendix III.C.5. The ducts will remain exposed in order to serve as an educational feature of the building. Spreadsheets with duct and diffuser information is in Appendix III.C.4.

4.6 Electrical

The major electrical demands of this facility include the computer lab, mechanical equipment (elevator and HVAC), and lighting. The overall electrical load on this building is 8 watts/square foot (Appendix III.D.1). This load will be served by two panels; a main panel in the basement and a second panel in the computer lab. The electrical line diagram is in Appendix III.D.2.d.

The electrical system will be supplied by a service from PECO. The 13.2 kV service will be converted to a 120/208 V supply to the building through a mounted transformer located at least 30 feet from the outside wall as required by PECO. The specifics of the transformer pad can be found in Appendix III.H.

4.7 Lighting

There are special considerations in design of the lighting system. The computer lab will require lighting that will reduce glare on the computer screens and the display area will be

equipped with lighting that will allow the projects on display to stand out. Also, because this building is in a highly vandalized area, it is necessary to include security lighting both within the building and on the building's exterior. Exterior lighting will be supplied by incandescent spot lights. Interior lighting will consist of 2' x 4' T-8 luminaires. These fixtures by Simkar are low brightness VDT parabolic. They produce little glare which is important in the areas where computers are used. These lights contain three 32 watt lamps by Osram Sylvania. Additional lighting will be supplied in the display areas within the display cases. Stairwells will contain wall mounted fixtures which will run off the emergency generator if a power outage occurs. The number of fixtures per room was calculated using the zonal cavity method as seen in Appendix III.E.1. A lighting layout is found in Appendix III.E.2. Rooms without fixtures have lighting supplied by single lightbulb sockets.

4.8 Plumbing

The plumbing fixtures in this facility include water closets, a urinal, bathroom, kitchen and laboratory sinks, and a stall shower. Based on the occupancy, this facility is required to have one female and one male lavatory. These lavatories are each equipped with handicapped stall for ADA compliance. The lavatories are located on the first floor and the caretaker's bathroom is directly above them. This resulted in stacked plumbing which will be more cost effective. They are vented through the roof by four inch vents.

The general plumbing requirements for this building are 25 gpcd for water supply to the facility with 60 gpcd for the caretaker's apartment. The estimated sewage flow rate for the entire building is 25 gpcd. There is an existing four inch water service entering the building and a five inch sanitary sewer leaving the building. A floor plan showing the various plumbing fixtures is included in Appendix III.F.2. Appendix III.F.1 shows the calculations to determine the adequacy of the existing service in the new plumbing system. There will be three laboratory tables in the general laboratory, each equipped with two sinks. A complete plumbing line diagram is in Appendix III.F.2.d.

4.9 Fire protection

The fire protection system in this building consists of smoke detection, audible alarms, portable extinguishers and sprinklers. The fire suppression system is a wet sprinkler system. The sprinkler heads will sit on top of exposed supply piping. They will be flow control sprinklers with a standard 1/2 inch orifice which close automatically once ceiling temperatures are significantly reduced. This allows for less water to be used and a reduction in water damage which will be useful in the event of a fire in or near the computer room. The fire protection layout can be found in Appendix III.G.2. Calculations pertaining to number of sprinklers and other data is in Appendix III.G.1.

The fire exits will be illuminated with the appropriate signage and the stairwells will be designed with firewalls having a minimum fire resistance rating of one hour. Manual alarm boxes are located within five feet of the entrances to the stairwells.

5.0 OUTDOOR FACILITIES

The outdoor facilities will be used to supplement what is taught in the education center. While the possibilities are endless for these facilities, based on input from the center, we will focus on four facilities that seem critical to the center at this point in time. They are the amphitheater, educational trail, pavilion, and observation deck. Sheet S-1 in Appendix X of this report shows a site layout of the proposed locations for each of these facilities.

An analysis using decision matrices was used to determine the alternatives for each outdoor facility that would provide the most utility for the project. The matrices were created by selecting the most important criterion for each specific facility, and then weighing it according to its rank of importance. Each alternative was then tested to see how it ranked against the specified criterion. The alternatives with the highest scores were then considered as a method of construction. The most important criteria regarding the CCCEEC project focuses on client's needs, durability, safety, wheel chair accessibility, and vandal deterrence.

The center's four outdoor facilities will all lie in flood plains and will need to be designed accordingly. There are two ways that we considered to design the facilities: the first was to with a lower cost for materials but an understanding that there will be a considerable replacement cost after flooding and vandalism. The second method was with higher cost materials to thus withstand a significant flood, and possibly to negate any replacement costs. This degree of durability will also reduce the costs for vandalism repair.

It was the opinion of KABB Associates that the most effective design was one that would minimize the replacement cost caused by flooding and vandalism, which would require over designing certain parts of each facility.

5.1 Amphitheater

One request of CCCEEC was a facility, such as an amphitheater, that could serve as an outdoor classroom and provide a productive setting for teacher/student communications and information exchange. It will include seating for thirty students, and a stage for presentations from the instructor. This stage will also include a structure that will support a movie screen, writing board, and presentation materials needed for instruction or for community gatherings such as movies, concerts, or presentations.

KABB Associates is looking for a natural setting that will require minimal excavation and provide the slope and bowl shape that would be optimal for the amphitheater. There are two areas at the site that provide a perfect setting for the facility. One is located on the east side of the building, and the other is on the west. In order to avoid sunglare, it was decided that the western site would be the ideal location to place the amphitheater.

The three major parts of the amphitheater that need to be considered are seating, stage backdrop, and ground covering. The considerations for design revolve around safety, durability, cost, and codes if applicable.

The decision matrix used to arrive at the final design of the amphitheater can be seen in Appendix IV.D. It was determined that the most durable method of design for the amphitheater was a concrete based seating arrangement with a footer. A plan view showing the seating

arrangement and stage set up can be found in Appendix IV.B.1 and IV.B.3. The outside seating radius is 19' with 3 tiers of seats which will accommodate 45 people. A row of steps was added in the center of the seating to allow easy access to the stage and for another exit (Appendix IV.B.2). There is a 2' walkway between the seats and a flat area behind the last row of seats for handicapped persons. The seats are stepped up so that the stage will be visible to all people when sitting. A seating detail showing the design is seen in Appendix IV.B.2. The seats are sloped away from the stage and away from the steps to control the drainage. Rounded edges were added to the seats to minimize any scratches and also to prevent cracking from possible use by skateboarders or inline skates. While it may be extravagant, we feel that it is easier to put in sturdy components now rather than have them deteriorate quickly and replace them every five years or so.

5.1.1 Material Design

The decision matrix in Appendix IV.D shows that the following were the best materials were the best for constructing the amphitheater:

- Footer - 12" thick reinforced with # 4 bar mat with bars in both directions
- Seating - 8" radius walls with # 4 bar vertical and horizontal reinforcement, made of concrete
- Pathways and Podium - 2" of bituminous concrete over 3" of stone
- Backdrop for props will be of round metal or wood post construction designed for multi-purpose use

5.1.2 Design Calculations

The footer design requires a minimal area to support the vertical load and the design was based on horizontal forces in flood situations. The design must be able to withstand various kinds of flooding which is why it is built extra strong. The punching shear is minimal as is the seating wall load. The seats are concrete tiers in a semi-circle. By keeping materials to a minimum, we hope to reduce the vandalism since the seats cannot be removed. Graffiti can

always be painted over or removed. All calculations regarding the amphitheater design are in Appendix IV.A.

5.2 Pavilion

The pavilion is not a direct request of the center, but it is a component we feel could provide great benefits to the educational center and the community. There is currently a picnic area to the north of the building that will provide a great location for this facility.

There were several alternatives for the design of this simple structure. The main consideration of the design was an affordable size that meets the budget. The structure would also need to provide for an addition in the future to increase the size. The structure will be placed in a site that has the possibility of being flooded, so the design of a structure of this nature must account for this situation. Most important in this design is the nature of the posts and footings that support the roof structure.

The pavilion will be a covered area with picnic tables for student lunches or educational activities. The pavilion may also be used for community gatherings and may attract a lot of people and possibly a lot of unwanted attention from vandals. Therefore, the first and foremost criteria of the pavilion is the durability.

To insure the durability of the of the pavilion facility, 6" x 6" posts anchored to the concrete footers will be used. The over design of the posts and anchors are intended to overcome a direct hit from debris in floods. Sheets OP-1, 2, & 3 in Appendix X, show side, front and top views of the pavilion. We have chosen a square pavilion since it will be relatively easy to construct. We plan on using community members to construct the facility to cut down on costs and allow the community take pride in their accomplishments. In this way, we also hope to cut down vandalism since the community will have taken ownership and have investments in this project.

5.2.1 Material Design

The following materials were chosen to construct the 720 SF pavilion:

- 6" x 6" pressure treated posts anchored to 2" x 2" foundations
- 6" x 6" pressure treated beams
- 2" x 4" wood trusses with a 22' span designed to support 30 psf with galvanized fastening brackets
- 20 year asphalt shingle roof
- Foundation depth for posts exceeds frost line requirements
- 2" Bituminous Concrete floor surface on 3" stone base

Other materials were considered and the decision matrix can be found in Appendix V.D. In addition, six picnic tables will be bought or constructed to place in the pavilion so it can be used as a picnic area or as seating for various community events. The pavilion will seat 50 people.

5.2.2 Design Calculations

The following was determined to be the criteria that we need to meet to make a pavilion that would be durable; trusses that support 30 psf live load (snow) as required by BOCA; 6" x 6" beams with a design deflection << L/360, exceeding the 8" unbraced length compression load. The foundation will be 2" bituminous concrete over 3" stone and the posts will have 2' by 2' concrete footers. Calculations for loads can be found in Appendix V.A.

5.3 Environmental Trail

Another request of the center is to provide a trail through the local habitat to be used as an educational tool. All individuals will be able to access the trail. The trail will pass through wooded areas and wetlands, and provide access to the stream for experimentation purposes. The

site offers one location that meets the needs requested by the center as seen in Sheet S-1 of Appendix X.

The environmental trail will be located close to the creek to allow for viewing enjoyment of wildlife and local flora and fauna. It will connect to the observation deck so students can walk the trail and end on the dock. To insure the durability and the stability of the supported trail deck, 6" x 6" pressure treated posts will be used. The large cross-sectional area will insure stability in support, and good durability to prevent destruction during a flood. The side view of a portion of the trail is in Appendix VI.B. A wooden guide is located on either side of the trail to prevent wheelchairs from rolling off of the trail.

5.3.1 Material Design

The following was determined to be the best materials to use for the trail as seen in the decision matrix (Appendix VI.D):

- 6" x 6" pressure treated posts set in foundation
- 2" x 8" pressure treated beams supporting 2" x 6" pressure treated deck
- 2" x 4" pressure treated edge rails on sides of deck
- 18" diameter x 3'-2" deep tapered foundation for posts below frostline

5.3.2 Design Calculations

The criteria for the material selection of the trail is as follows:

- 6" x 6" post load capacity >> exceeds allowable compression load
- 2" x 8" actual deflection < L/360
- Punching shear minimal
- Foundation area minimal
- No reinforcement required

Appendix VI.A shows the detailed calculations for loads on the trail.

5.4 Observation Deck

The last outdoor facility that will be constructed is the observation deck. The client wishes to have an area that is right next to or overhanging the creek so that students could take stream measurements and perform experiments regarding contaminants and stream flow. Again, it would have to be handicapped accessible and secure. For this reason, a 10' x 10' platform was decided upon. Seats may also be incorporated in the siderails to have a rest area or a gathering area, but would require a larger platform for capacity. Slats of 1.5" will be spaced 3" apart along the handrail extending to the deck to prevent small children from the danger of falling from the pier. A locked gate, 1.5' of the 3.5' high handrail, will be designed in the handrail facing the creek. During experiments an authorized person will be able to unlock the gate for handicapped accessibility or for shorter students. Appendix VII shows front, top and side views of the observation deck.

5.4.1 Material Design

The following was determined to be the best materials to use for the observation deck:

- 6" x 6" pressure treated posts set in concrete foundation
- 2" x 8" pressure treated beams supporting 2" x 6" pressure treated deck
- 4" x 4" pressure treated handrail posts with 2" x 4" pressure treated tops
- 1" x 6" pressure treated handrail sill board
- 1" x 1.5" pressure treated vertical slats

18" diameter x 3'-2" deep tapered foundation for posts below frostline

5.4.2 Design Calculations

All of the load and material calculations were taken from the design of the educational trail.

6.0 ACCESS AND PARKING

The facility's location at 63rd and Catherine Streets is easily accessible by walking, driving, or public transportation. It is the hope that for community events, people will leave their cars at home and walk or take public transportation. In the case that people will drive, a limited parking area will be provided on site or street parking is permissible. The public transportation aspect is being evaluated by two freshman design groups who are designing the SEPTA station at Baltimore Avenue and the 63rd Street stop of the Market-Frankford Line.

6.1 Traffic Pattern

In order to determine the effect that the center's renovation would have on local traffic patterns, we had to perform a traffic count. There were three traffic patterns observed. It was found that at peak hours (7-8am and 4:30-5:30pm) 700 cars over two lanes traveling south along 63rd Street passed through the intersection at 63rd and Catherine Streets. 600 vehicles per hour was found to be the peak for cars traveling north along 63rd Street. The maximum number of cars entering and exiting Catherine Street during these times was 100 vehicles per hour. Seeing that most of our visitors would be school children bused here between 9am and 3pm, there would be minimal car traffic added to the pattern. The buses would add a slight disturbance to the traffic patter but would not require alterations to the existing traffic patterns. The traffic signals at Cedar Street to the north and Christian Street to the south, give an adequate lull in order to allow cars to turn into our site or to exit.

6.2 Parking

The parking lot will have 12 spaces to be used for caretakers, rangers, and other staff as necessary. On weekends, the spots may be used primarily by handicapped community members attending events. Loads from the buses require 4" of fill, 4" of base course, and 2" of surface course. The buses will be parked along 63rd Street due to the limited area for parking. The buses will have a turn around to the north of the center which requires a 24.4' minimum design radius. While the recommended turn around radius is 42', we have designed a turn around with a radius

of 65' which allows enough space for the buses to turn around safely and extra space for patrons to stand. There may be room in the center of the turnaround for a circular garden area which will add to the overall beauty of the site. The north and west edges of the parking area will have 6" concrete curbing to restrict access of unauthorized vehicles and for drainage purposes.

7.0 DRAINAGE

There is a very steep 2.5 to 1 slope leading down to the structure and along the current driveway. With the addition of a parking lot or any impervious area there is a need for a drainage system that would direct the water away from the building and the lot. There will be an additional 8,000 square feet of impervious area on the site totaling 13,400 square feet. The area requires three inlets and 410 feet of 12" concrete pipe. The storm sewer design will accommodate a 25 year storm and the 40.4 inches of annual rainfall in the Philadelphia region. Appendix IX shows the rainfall data used to calculate runoff due to impervious area. Ii also contains an elevation showing the location of the flood plain.

8.0 COST

The cost for this facility $2.4 million. That is not within the allowable $2.1 million that the center has fund raised for construction. Of this, $2.1 million is allocated to the building and the remainder is for the outdoor facilities which range from $4k to $30k. In addition, fees and permitting have been included to ensure that the client will not have unexpected costs. Cost breakdown for the facilities can be found in Appendix XI.

The design fees for this term were approximately $34,000. The entire year's fees were $70,000. This is not consistent with the previous terms design fees of $12,000 and $24,000 respectively. This is due to an unexpected amount of time spent on finalizing AutoCad drawings. A break down of hours by personnel and by task can be seen in Appendix XI. In actuality, we have spent minimally on this project, utilizing contacts at prior co-ops and other resources. We have spent minimally for the design reports and associated materials of this project.

While theoretically we, as an engineering firm, are charging a fee for these design services, this project is more of a pro bono project. The community has raised a lot of money for the center's renovation and construction and design services really aren't a part of that. The benefits that the community will receive as a result of this center being added are enormous and an engineer should take some time and do some projects like these.

9.0 SCHEDULE

KABB Associates has scheduled the design of this project for nine months starting on September 21, 1999 and concluding on May 26, 2000 with the submission of the final report. The detailed schedule for can be seen in Appendix XIII. The final version of the schedule has been revised several times as the introduction of new deadlines were added and as various other commitments by group members were realized, the schedule had to be revised.

10.0 DISCUSSION

The Cobbs Creek Community Environmental Education Center was a challenging project to work on. KABB Associates worked with the center to design a center and outdoor facilities that would be harmonious with the surroundings and provide the environmental education that is so desperately needed in the Cobbs Creek Community. Our firm has worked diligently to design a facility that would incorporate as many of the center's wishes as possible. We have even introduced a few of our own that we feel would be beneficial to the center. There were numerous discussions on what the important criteria for the center are and what materials would be used for the outdoor facilities. In the end, we believe that we are on our way to producing a cost efficient, all encompassing environmental education center which will benefit the community for years to come.

11.0 FUTURE CONSIDERATIONS

The expansion possibilities for the center are endless. Our design group focused on the building and several outdoor facilities that will serve as a starting point for the center. The

References and Consultants

References

Cobbs Creek Community Environmental Education Center: A Feasibility Report. June 17, 1992. Adele Naude Santos and Associates.

Stein, Benjamin, and John S. Reynolds. *Mechanical and Electrical Equipment for Buildings, 8th edition.* John Wiley & Sons, Inc., New York, NY, 1992.

Allen, Edward, and Joseph Iano. *The Architect's Studio Companion, 2nd edition.* John Wiley & Sons, Inc., New York, NY, 1995.

Consultants

Tague Lumber, Philadelphia, PA for lumber pricing and hardware
RSMeans: Building Construction Cost Data, 58th Edition for costs of trusses, concrete
Wolfe Scott Associates, Philadelphia, PA for labor costs associated with construction
PAR 4 Electric Corporation INC., Delran, NJ for all electrical pricing
Elliott-Lewis Corporation, Rosemont, PA for mechanical and plumbing pricing
License and Inspections, Philadelphia, PA for questions

facilities are versatile and will be used for both environmental purposes and community purposes. The building will be used as a learning tool. The ductwork will remain exposed and other facets of the building such as lighting fixtures or the basement mechanical area can be used as teaching tools. In addition, a design project may be to actually design the interior of the building and determine fixtures and room layouts with furniture, wall amenities and the like. It is also a possibility to have freshmen design groups design labs to be performed indoors and outdoors. A water wheel that would provide electricity to a small structure, or a flume of sorts to demonstrate hydraulic properties are some possibilities of what could be designed.

The caretaker's apartment, which is located on the second floor, will eventually be converted to classroom or laboratory space. There is a need for a house to be designed, on site, for this caretaker to live in.

This site is also adjacent to basketball and tennis court located on 63rd Street. They appear to be run down but with the revival of the stable as a community and environmental center, it would be an excellent idea to renovate the courts so that they become safe and usable again. Across the creek there is an open field. This field could be used as a recreation field where soccer games could be held. It could also be used for carnivals.

ACKNOWLEDGMENTS

KABB Associates would like to thank the following people for their assistance in the completion of this project:

Mrs. Carole Williams
Mr. Alan Fastman
Dr. Richard Woodring
Dr. Joseph Martin
Jessica Geftic
Matthew Marcello
Joy Morgan
Justin Ruby

APPENDIX I
CCCEEC

A. Capsule look

B. Programs offered

APPENDIX I.A

A Capsule Look at CCCEEC

Brief historical sketch of the Center

The Cobbs Creek Community Environmental Education Center (CCCEEC) was founded in 1991 by Mrs. Carole Chew Williams, who, with her husband, former State Senator Hardy Williams, live in the neighborhood and have great interest in Cobbs Creek and its potential educational value to area children. From the outset, Mrs. Williams invited community leaders, representatives from area businesses and industries, government officials, representatives from the School District of Philadelphia, and officials of Fairmount Park to participate as members of a Steering Committee. Presently, many of these individuals serve on the CCCEEC Board of Directors. A relationship was established with Penn State Cooperative Extension Program through which CCCEEC was offered office space and use of other resources at Penn State's 4601 Market Street location. In 1993, the Center was organized as a not-for-profit Pennsylvania Corporation.

Through a synergistic interplay among local residents, educational institutions and environmental advocates, CCCEEC has developed a proven and successful track record of achievement in urban environmental education and environmental regeneration. It has done this with focused, practical programs which are small-scale in execution, but visionary in application.

In 1991, a former police stables at 63rd and Catherine Streets was identified as a permanent space for the organization. Owned by Fairmount Park, the building was leased to CCCEEC in 1992, and a community-based campaign to raise the necessary moneys began. **On June 27, 1994, Governor Robert Casey authorized the Philadelphia Industrial Development Corporation to apply for Redeveloped Assistance funding in the amount of $540,000 to fund capital improvements to the stable building next to Cobbs Creek. A match was obtained from the City of Philadelphia in the amount of $300,000 and also from the William Penn Foundation for $200,000. This met the one-for one match from the State. The capital funds now total 2 million Dollars.**

From its inception, CCCEEC has developed and offered numerous hands-on educational programs, in partnership with local and regional educational organizations. The organization is a focus of local pride and aspiration, catalyzing a community-wide vision and commitment to utilizing Cobbs Creek to enhance the community - using existing and new recreational and educational facilities and opportunities.

Mission and Goals

The programs of the Center are designed to help community members establish a personal connection with the local ecology, and to help them acquire the skills and structure to build, preserve, and protect their natural and human environment. CCCEEC is particularly committed to strengthening environmental education in urban schools through hands-on activities and research. In all its endeavors, CCCEEC works to create partnerships among community, schools, industry, government, and educational institutions involved in environmental education. The Center is committed to reaching and serving those who- because of ethnicity, income level, and/or urban background - are not traditionally associated with environmental concerns.

Constituency

CCCEEC serves the communities around the Cobbs Creek watershed: an area that encompasses West and Southwest Philadelphia, Overbrook, and eastern portions of Lower Merion Township. Figures from 1990 census for Cobbs Creek community are:

Total Population: 122,956

African-American Population: 97.4%

Unemployment: 7.9%
Vacant Housing Units: 1,184
Median Housing Value: $28,425
School Enrollment: 7,522

High School Graduates 59.7%

Living Below Poverty Level: 19.8%
Per Capita Income: $9,649

Cobbs Creek also has a rising Asian population, with whom the Center is committed to working. Further, CCCEEC is striving to develop ties with Upper Darby, a largely white working class community on the other side of the creek. The center would like to establish a partnership with Upper Darby High School's outstanding environmental program, a natural partnership because Cobbs Creek flows into Darby Creek. We have established a working relationship with the following schools, the common link being Cobbs Creek's relationship to the headwater and tributaries located in tributaries located in these areas: Andrew Hamilton (public urban), Friends Central School (independent), Radnor Middle School (public suburban), St. Carthage (Catholic), and World Technology Charter School (public independent).

Through its programs, CCCEEC serves 14 schools in the Bartram Cluster and four schools in the West Philadelphia Cluster. In 1997, CCCEEC served 200 students directly through environmental education programming which is a mandated subject by the Pennsylvania State Department of Education. Plans exist for outreach work in later phases; however, projects to date have benefited schoolchildren, teachers, and adults of the immediate community.

A programmatic priority, which will be made possible by the stabilization of staffing, is to develop internships for graduate students from partner colleges: Ursinus College, Chestnut Hill College and Lincoln University. CCCEEC is committed to offering graduate students in environmental sciences research opportunities and mentoring in program management. A particular emphasis is on positioning African-American students to move into leadership roles in the nonprofit, environmental, horticultural, and scientific areas.

Services Provided

CCCEEC has successfully implemented a number of projects as early as 1992, such as: Earth Day '92, The High School Conference (1992), The Summer Science Camp (1993), the Environmental Scholars Program (1992-to the Present), the After School Environmental Club (1993-to the present), Block-Comer recycling (1994), Home Energy Audit Program (1994), and the Educators Advisory Council (1995).

Current Programs include the following :

- The Environmental Scholars Program
- The Tree Survey Project
- The Urban Watershed Program
- The Environmental After-school Clubs
- The Learning Grove/Trail Development Project
- The Park Management Summer Program (The President's Environmental Youth Award, 1999)
- The Teacher Training Program

Partnerships and Funding Providers:

The following list of partners demonstrates an effort to build linkages and supports within and between urban/suburban, majority/minority, age articulated groups, and the private and public sectors in efforts to both bring about equity and to help protect and restore the environment.

- Academy of Natural Science: PISEC* and Teacher Training
- Adele Naude Santos and Associates: Architectural Consultants: Prepared building and site plans.
- Bryn Mawr College: Girl Scouts program; high school and college students collaborating in horticulture.
- Chestnut Hill College: Technical assistance.
- Community College of Philadelphia: Technical assistance.
- Commonwealth of Pennsylvania: Funding for building renovations
- Commonwealth of Pennsylvania, Department of Environmental Resources: assistance for architectural fees
- Drexel University: Student intern assistance.
- Fairmount Park Commission: Leasing of the stable building and park services.
- Franklin Institute: PISEC*.
- Friends of Cobbs Creek Park: Community base and catalyst for the Center; Board members.
- Haverford College: Technical assistance; photography program.
- Juniata College: Technical assistance.
- Lincoln University: Technical assistance.
- Mercy Health Plan: Financial support for accounting; funded tree survey project.
- Morris Arboretum: Technical assistance; funding.
- New Jersey State Aquarium: PISEC*.
- PECO Energy Company: Financial support; management consulting; Board member.
- Pennsylvania State University, Cooperative Extension Service: Host for Center administrative office; ongoing technical assistance in program development.
- Philadelphia Activities Fund: After-school environmental club funding.
- Philadelphia College of Osteopathic Medicine: Technical assistance; Board member.
- Philadelphia College of Pharmacy and Science/University of the Sciences: Meeting and conference space; Board member.
- Philadelphia Education Fund: Technical assistance; teacher training.
- Philadelphia Foundation: Financial support for financial services.
- Philadelphia Green: Technical assistance and support for summer and after-school programs.
- Philadelphia Recycling Office: Program support and materials.
- Philadelphia Urban Resources Council (PURP): Funding; technical assistance.
- Philadelphia Water Department: Workshops; curricular materials; membership on their Board for Storm Water Management and their Educational Outreach Committee.
- Private Industry Council: Summer program funding.
- Radnor Middle School: Collaboration.

- Samuel S. Fels Fund: Project funding.
- School District of Philadelphia: Technical assistance and collaboration.
- Simmons Business Systems: Technical assistance in computers and software.
- State Senator Anthony Hardy Williams: Staff and facility support; legislative support.
- Temple University: Technical assistance.
- Ursinus College: Student participation in community service projects.
- U.S. Department of Agriculture, The Forest Service: Funding for feasibility study; funding for curricular projects; Board member.
- U.S. Environmental Protection Agency: Funding for outreach services; project funding.
- U.S. Environmental Protection Agency Employees Association: Presence and support for annual Earth Day activities.
- Walnut Park Plaza: Use of conference center; donation of food services.
- William Penn Foundation: Capital funding.

An additional group of partners will almost certainly come from an upcoming meeting which will be convened by the Honorable Wilson Goode, Regional Director for Region III of the U. S. Department of Education with representatives from the National Science Foundation and the central office of the Environmental Protection Agency.

* PISEC: Philadelphia-Camden Informal Science Education Collaborative.

Estimated Funding Needed for Center's Completion

Capital Expenditures:

Elevator and Handicapped Access	$ 57,000.00
Laboratory Facilities, 2nd floor	325,000.00
Security Video Center & Remotes	65,000.00
Computer and Video Network Backbone	25,000.00
Sub Total	$472,000.00

External Facilities

Care-takers/Security/Storage Building	$ 125,000.00
Security Fencing	100,000.00
Landscaping	100,000.00
Sub Total	$325,000.00

APPENDIX I.B

Cobbs Creek Community Environmental Education Center
PROGRAMS

The Environmental Scholars Program
This program teaches students in-depth science and laboratory skills using hands-on learning methods. As students begin designing strategies for reclaiming the creek, they will conduct stream studies that test water and soil quality and research the history of Cobbs Creek and the surrounding watershed. Cobbs Creek is the only watershed that is not regularly monitored by the State. Students will also participate in field trips to the Stroud Water Research Laboratory, the Academy of Natural Sciences, and colleges and universities.

The Tree Survey Project
This national project is funded by Morris Arboretum and the USDA Forest Service. Students learn the techniques used to measure the role and significance of urban vegetation in reducing air pollution in the nation's big cities.

The Urban Watershed Program
This program is field-based, hands-on investigation of Cobbs Creek. Students study the Cobbs Creek watershed as a living laboratory.

The Environmental Clubs
This after school program engages students through hands-on activities in environmental studies such as developing an appreciation of their world through activities such as recycling, litter control and composting.

The Learning Grove / Trail Development Project
This project provides an opportunity for teachers, students, and community residents to design an outdoor classroom near the site of the center. The Center also plans to reclaim, restore and develop naturalist curricula for a trail connecting the Center to Tinicum Wildlife Refuge. The trail would have both recreational and academic uses.

The Park Management Program
The Park Management Program for youth is a six-week summer program for high school students. The goals are to provide environmental education and to increase community awareness. Students conduct studies and clean up the parks, and they learn skills that further their own personal development. The students come away with an enhanced image of themselves and their community. This past summer (1999), the students cleaned and beautified the mini-park at 61st & Baltimore and they took a field trip to the Delaware Water Gap. ***The program received the President's Environmental Youth Award at a White House ceremony in 1998.***

The Teacher Training Program
This program trains teachers in environmental studies, with a special emphasis on water monitoring of Cobbs Creek from the headwaters in Radnor, PA to its confluence at Darby Creek.

Cobbs Creek Community Environmental Education Center

4601 Market Street, Second Floor
Philadelphia, PA 19139
PHONE: 215-471-2223
FAX: 215-471-2231
E-mail: ccw7@psu.edu
http://www.ntr.net/~reddin/CobbsCreek.html

Cobbs Creek Community Environmental Education Center's goal is to empower urban neighborhoods to build, preserve, and protect their human and natural resources by reclaiming Cobbs Creek for humans as well as wildlife. The Center's programs encourage minority students to explore careers in science. The Center is planning to develop field and indoor laboratories at the Center, a historic stable site. The Center pursues partnerships with educational, industrial, governmental, and community organizations to help achieve these objectives.

APPENDIX II
Site

A. USGS map
B. Street map

Appendix II

Figure A: USGS Map of the site.

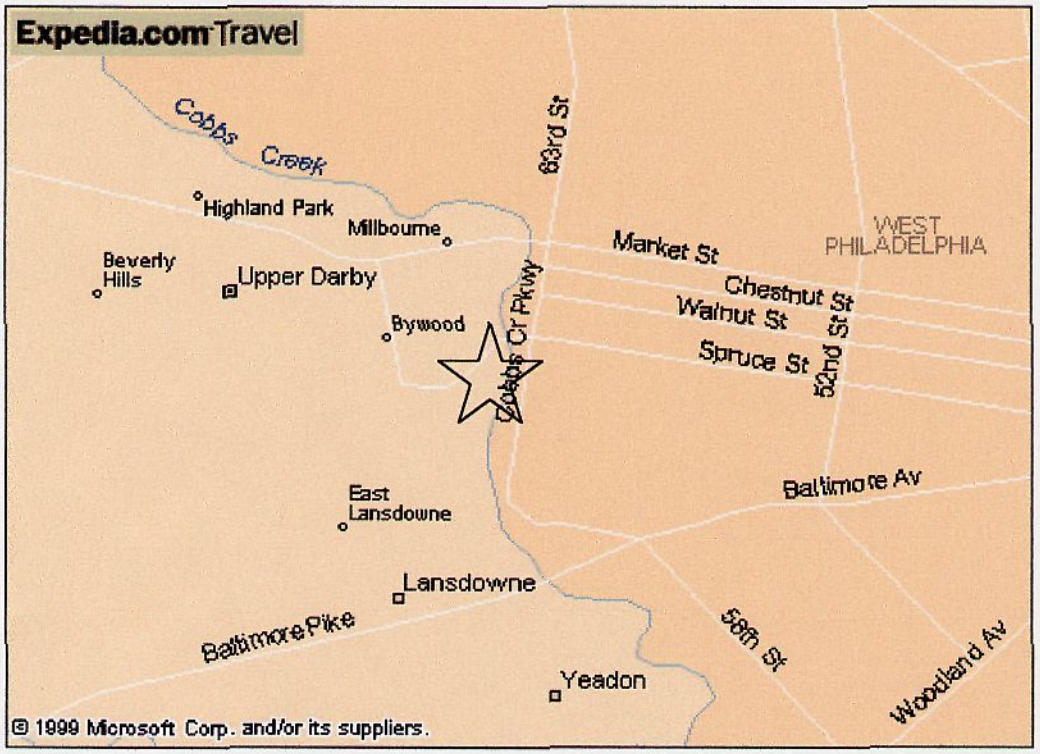


Figure B: Street map of the site

APPENDIX III
Building

A. Figures

B. Architectural

C. Mechanical

D. Electrical

E. Lighting

F. Plumbing

G. Fire Protection

H. Miscellaneous

I. Estimate

Appendix III.A
Figures

Appendix III.A
Figures

Figure 1 – Building exterior showing vandalism.

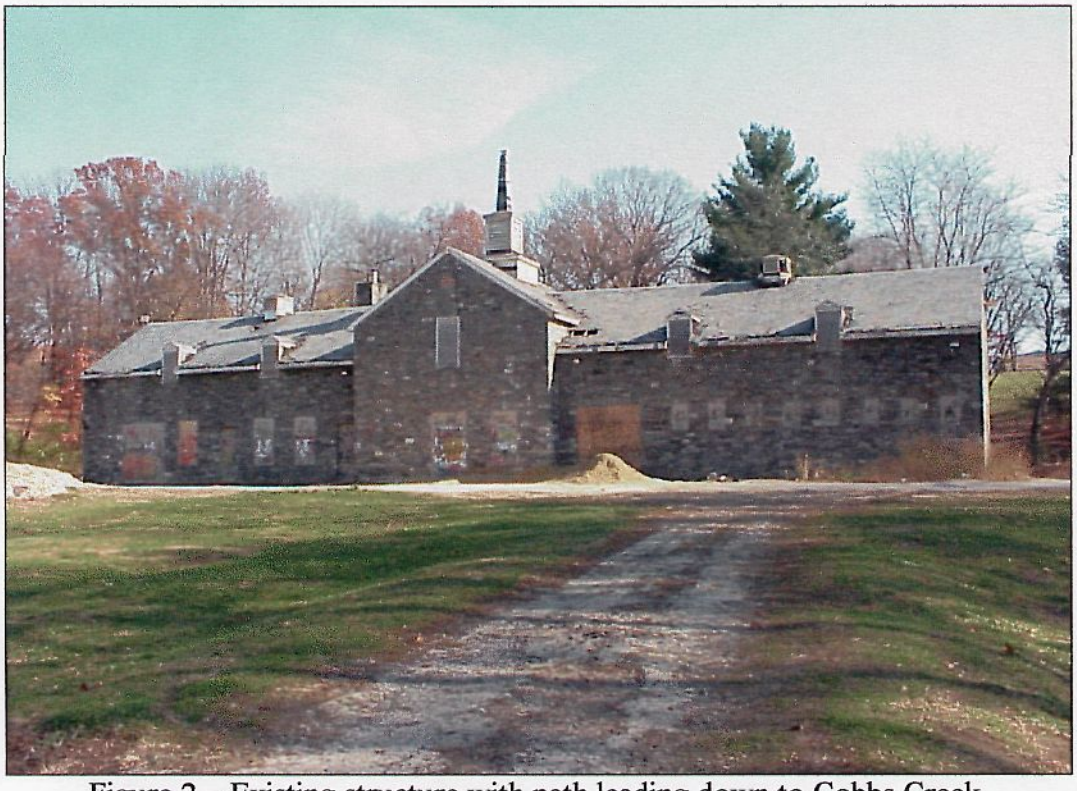


Figure 2 – Existing structure with path leading down to Cobbs Creek.

Appendix III.A
Figures

Figure 3 – Southwest corner joists with evidence of fire damage.

Figure 4 – Six five inch steel columns and stall posts in south wing.

Appendix III.A
Figures

Figure 5 – Central bay back wall. Left corner to contain duct chase.

Figure 6 – Basement with existing tanks.

Appendix III.A
Figures

Figure 7 – Existing utilities entering the basement.

Figure 8 – Second floor central bay. Future display area.

Appendix III.A
Figures

Figure 9 – Interior vandalism.

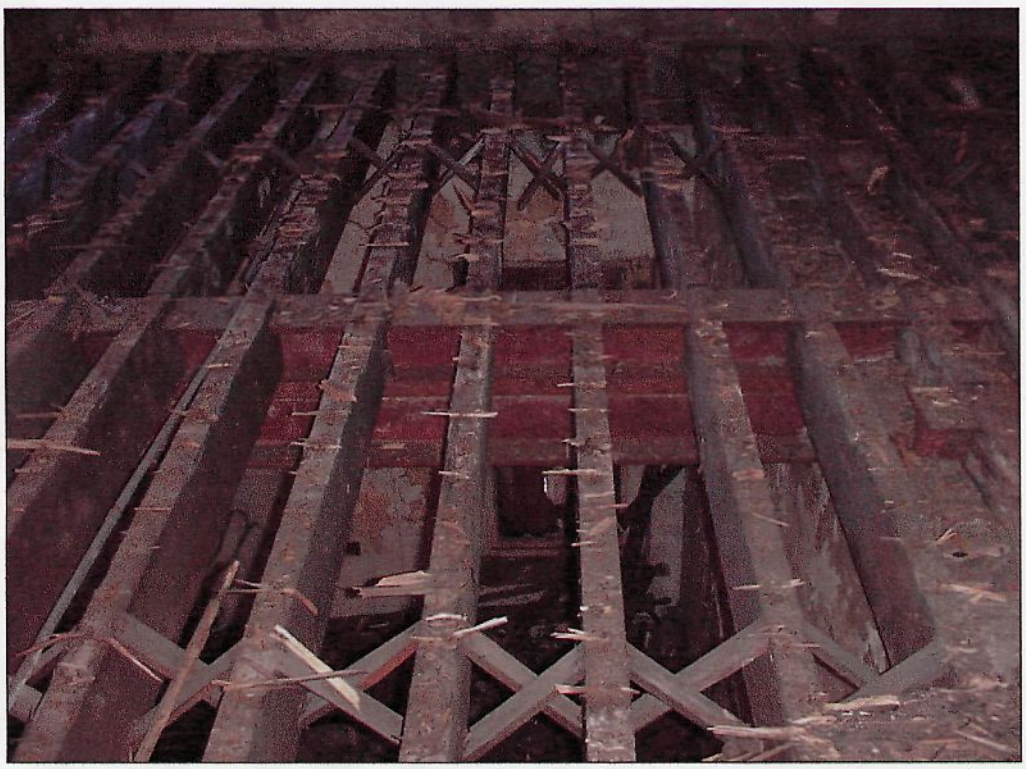


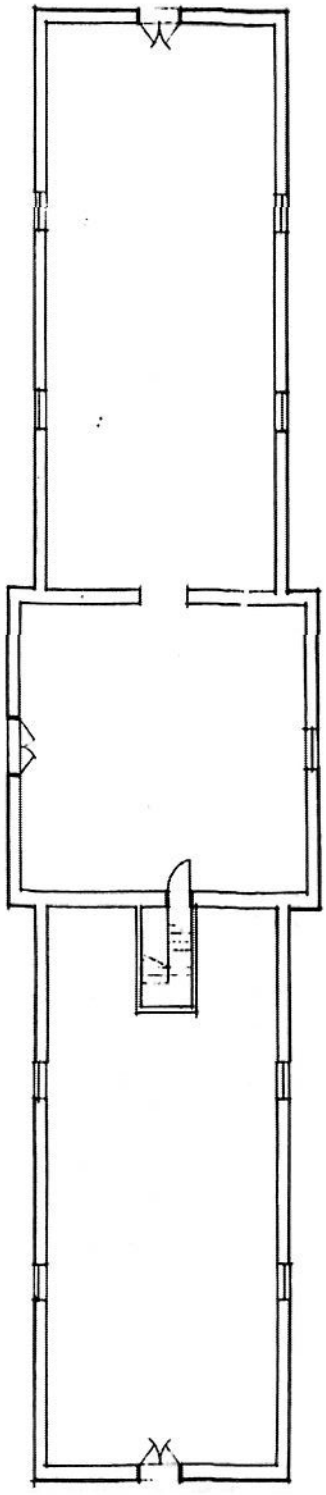
Figure 10 Three inch by ten inch floor joists bearing on central steel beam and exterior walls.

Appendix III.B

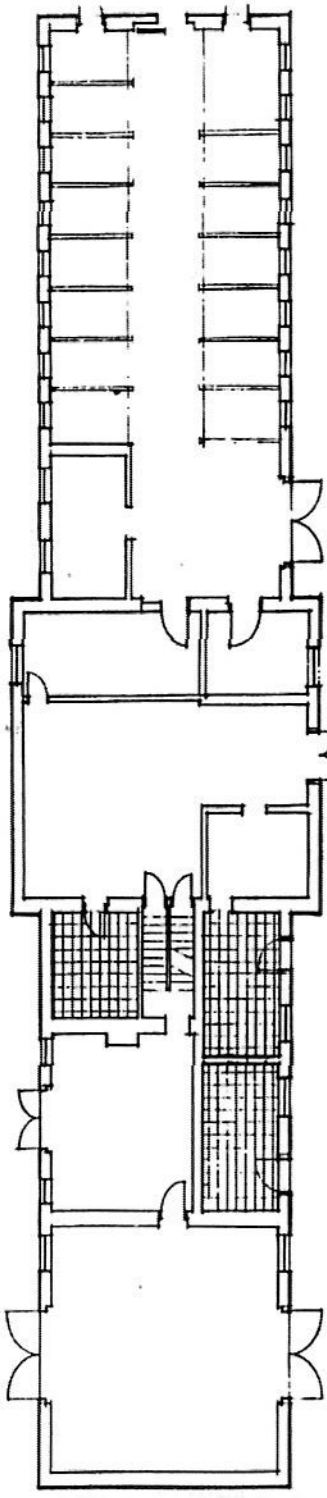
Architectural

1. Existing layout
2. Plans
   a. A-1 First floor architectural
   b. A-2 Second floor architectural
   c. A-3 Basement architectural
3. Space allocation

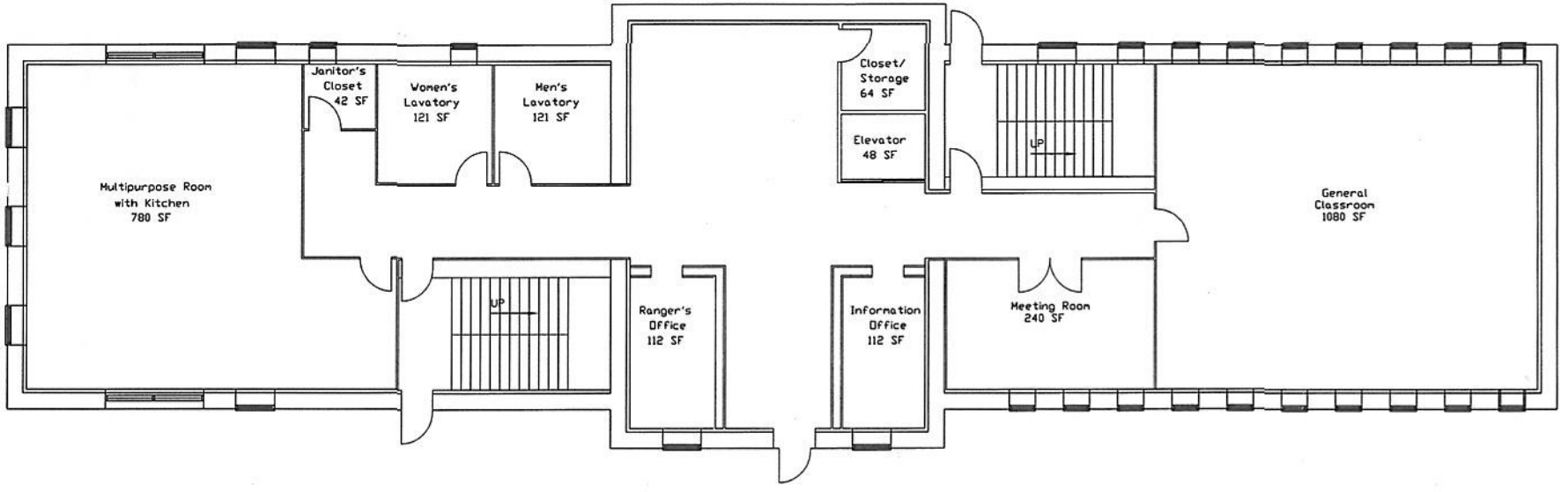
Appendix III.B.1
Existing Architectural Layout



Existing Building Loft
NTS



Existing Building First Floor
NTS



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

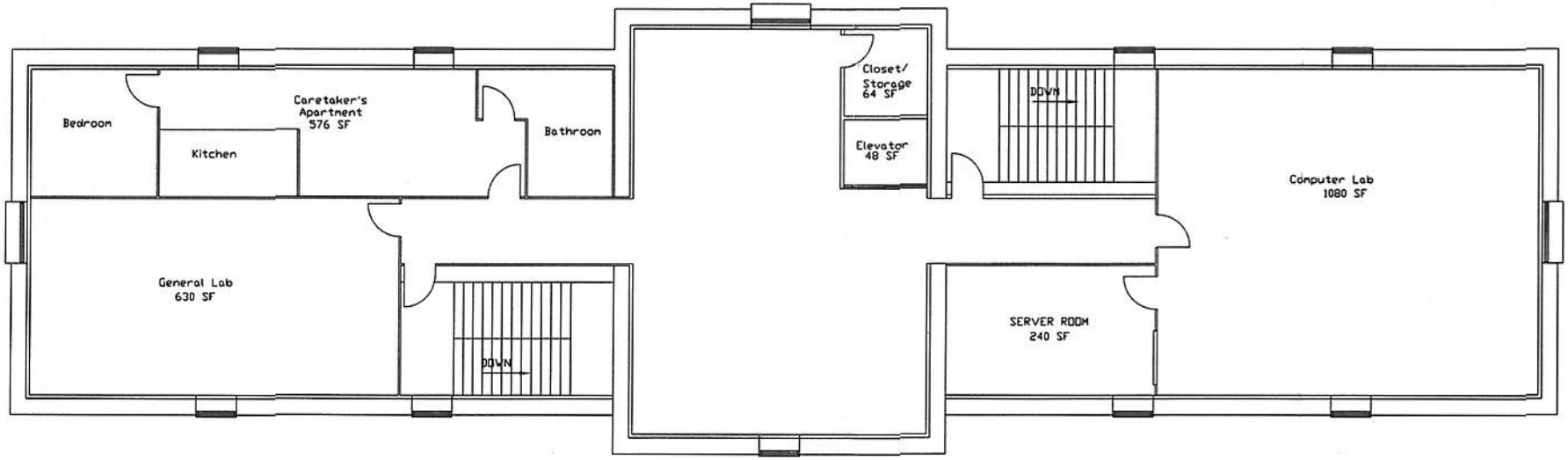
KARB Associates

Scale:
1/10" = 1'

26 MAY 2000

FIRST FLOOR
ARCHITECTURAL

A-1



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KARB Associates

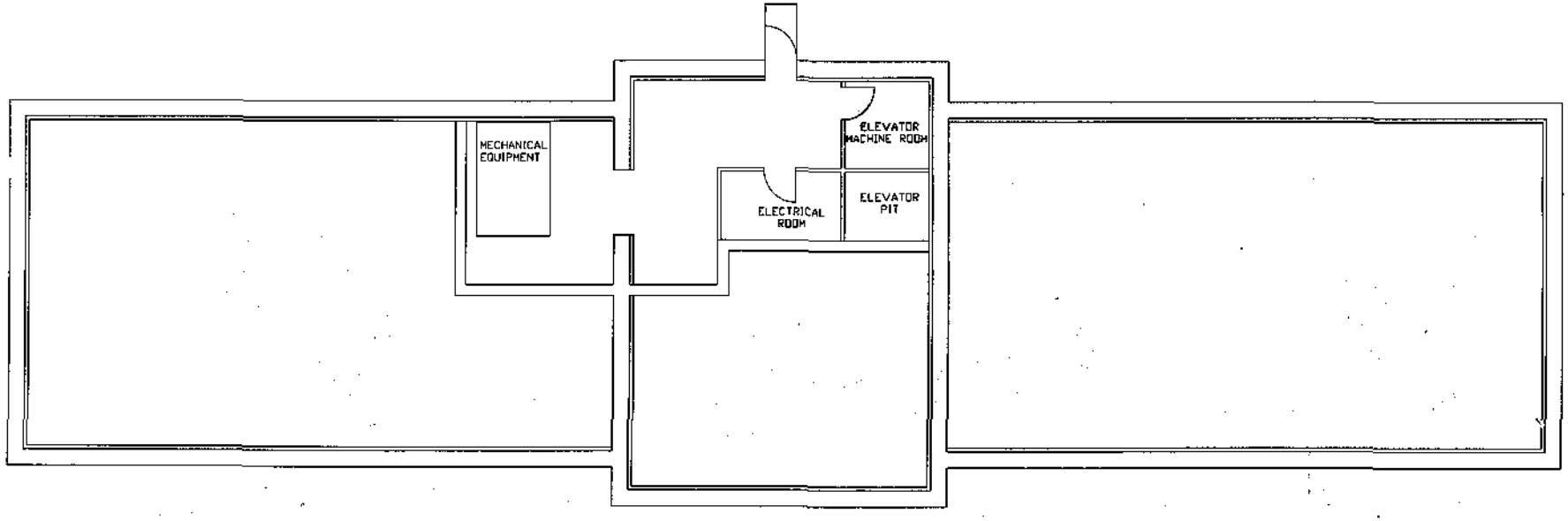
Scale: 1/10" = 1'

26 MAY 2000

SECOND FLOOR ARCHITECTURAL

A-2

App. III.B.2.c



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KLIE Associates

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
ARCHITECTURAL

A-3

Appendix III.C

Mechanical

1. Appliance loads
2. Cooling loads
3. Heating loads
4. Duct sizing
5. Plans
    a. M-1 Mechanical first floor
    b. M-2 Mechanical second floor
    c. M-3 Mechanical basement
    d. M-4 Mechanical line diagram
6. HVAC Equipment
    a. Matrix
    b. Unit

Appendix III.C.1

Appliance and Lighting Loads

Lighting: Q = (3.4) x (# of bulbs) x (watts per bulb) x (ballady factor) x (cooling load factor)

Information Office:

Lighting:

Q = 3.4 x 9 x 32 x 1.25 x 1.0 = 1224 Btu/hr

Appliances:

Computer = 10000 Btu/hr

Printer = 13000 Btu/hr

Total: 24224 Btu/hr

Ranger's Office:

Lighting:

Q = 3.4 x 9 x 32 x 1.25 x 1.0 = 1224 Btu/hr

Appliances:

Computer = 10000 Btu/hr

Total: 11224 Btu/hr

Multipurpose Room

Lighting:

Q = 3.4 x 36 x 32 x 1.25 x 1.0 = 4896 Btu/hr

Total: 4896 Btu/hr

Meeting Room:

Lighting:

Q = 3.4 x 12 x 32 x 1.25 x 1.0 = 1632 Btu/hr

Total: 1632 Btu/hr

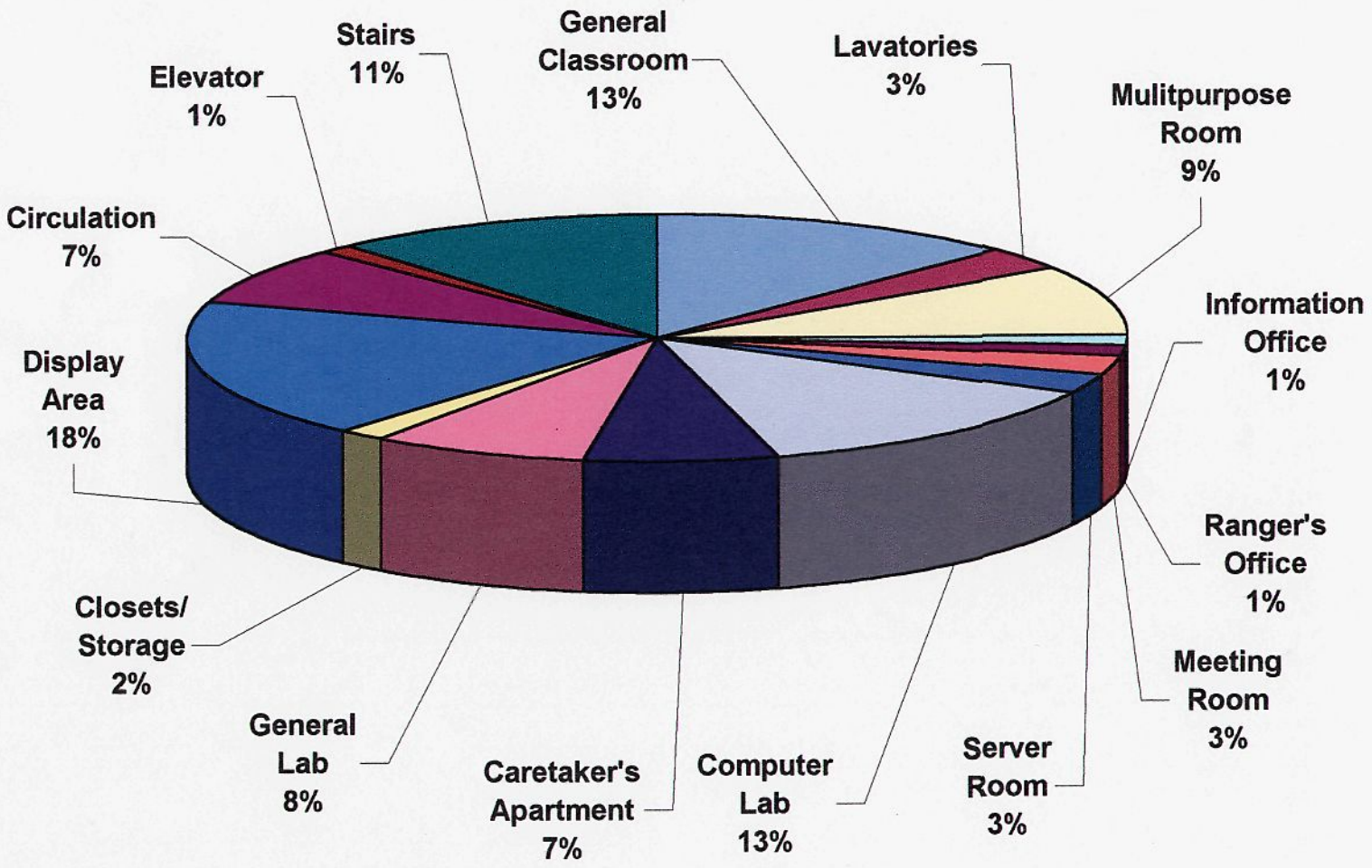
Display Area and Halls (first floor):

Lighting:

Q = 3.4 x 24 x 32 x 1.25 x 1.0 = 3264 Btu/hr

Total: 3264 Btu/hr

Appendix III.B.3
Space Allocation



Entry:

Lighting:

Q = 3.4 x 6 x 32 x 1.25 x 1.0 = 816 Btu/hr

Total: 816 Btu/hr

General Lab:

Lighting:

Q = 3.4 x 30 x 32 x 1.25 x 1.0 = 4080 Btu/hr

Total: 4080 Btu/hr

Display Area and Halls (second floor):

Lighting:

Q = 3.4 x 30 x 32 x 1.25 x 1.0 = 4080 Btu/hr

Total: 4080 Btu/hr

Bathrooms:

Lighting:

Q = 3.4 x 12 x 32 x 1.25 x 1.0 = 1632 Btu/hr

Total: 1632 Btu/hr

General Classroom:

Lighting:

Q = 3.4 x 15 x 32 x 1.25 x 1.0 = 6120 Btu/hr

Total: 6120 Btu/hr

Computer Lab:

Lighting:

Q = 3.4 x 45 x 32 x 1.25 x 1.0 = 6120 Btu/hr

Appliances:

10 Computers = #### Btu/hr

Total: ##### Btu/hr

Caretaker's Apartment:

Lighting:

Q = 3.4 x 18 x 32 x 1.25 x 1.0 = 2448 Btu/hr

Appliances:

Kitchen = 12000 Btu/hr

Total: 14448 Btu/hr

Cooling Load Calculations for First Floor

Project: Cobbs Creek Community Environmental Education Center
Location: Philadelphia, PA

Out. DB: 90 F
Out. WB: 74 F
D.R. 21 F

In. DB: 75 F
In. RH: 50 %

Room Name	Classroom					Lavatiories					Multipurpose					Information Office				
Plan Size	30 X 35					22 X 11					30 X 26 + 7 X 11					8 X 14				
	D.	U	A	CLTD	BTU/hr	D.	U	A	CLTD	BTU/hr	D.	U	A	CLTD	BTU/hr	D.	U	A	CLTD	BTU/hr
Wall	E	0.05	511	18	460	E	0.05	308	18	277	N	0.05	462	8	185	W	0.05	133	18	120
	S	0.05	462	11	254						E	0.05	385	18	347					
	W	0.05	511	18	460						W	0.05	483	18	435					
Ceiling/Floor		0.2	1050	9	1890		0.2	242	9	436		0.2	857	9	1543		0.2	112	9	202
Door	S	0.5	42	11	217						N	0.5	42	11	217					
Windows	D.		A	CLF		D.		A	CLF		D.		A	CLF		D.		A	CLF	
	E		56	36	2016	E		16	36	576	N		96	15	1440	W		32	36	1152
	W		56	36	2016						E		32	36	1152					
											W		32	36	1152					
Infiltration					2434					561					1987					260
People	16 X 225				3600						25 X 225				5625	1 X 225				225
Appliances																				23000
RSCL					13347					1850					14082					24958

Room Name	Ranger Office					Meeting Room					Display Area (and Hallways)					Entry				
Plan Size	8 X 14					18 X 12					61 X 6 + 20 X 22					10 X 14				
	D.	U	A	CLTD	BTU/hr	D.	U	A	CLTD	BTU/hr	D.	U	A	CLTD	BTU/hr	D.	U	A	CLTD	BTU/hr
Wall	W	0.05	133	18	120	W	0.05	252	18	227	E	0.05	329	18	296	W	0.05	140	18	126
Ceiling/Floor		0.2	112	9	202		0.2	216	9	389		0.2	806	9	1451		0.2	140	9	252
Door																W	0.47	21	11	109
Windows	D.		A	CLF		D.		A	CLF		D.		A	CLF		D.		A	CLF	
	W		32	36	1152	W		24	36	864	E		32	36	1152					
Infiltration					260					501					1869					325
People	1 X 225				225	6 X 225				1350										
Appliances					10000															
RSCL					11958					3331					4768					812

Cooling Load Calculations for Second Floor

Project: Cobbs Creek Community Environmental Education Center
Location: Philadelphia, PA

Out. DB: 90 F **In. DB:** 75 F
Out. WB: 74 F **In. RH:** 50 %
D.R. 21 F

Room Name	Computer Lab					Caretaker's Apartment **					General Lab				
Plan Size	30 X 35					12 X 48					35 X 18				
	D.	U	A	CLTD	BTU/hr	D.	U	A	CLTD	BTU/hr	D.	U	A	CLTD	BTU/hr
Wall	E	0.05	511	18	460	E	0.05	693	18	624	N	0.05	273	8	109
	S	0.05	462	11	254						W	0.05	511	18	460
	W	0.05	511	18	460										
Ceiling/Floor		0.2	1050	9	1890		0.2	576	9	1037		0.2	630	9	1134
Door															
Windows	D.		A	CLF		D.		A	CLF		D.		A	CLF	
	E		56	36	2016	E		16	36	576	N		96	15	1440
	W		56	36	2016						E		32	36	1152
											W		32	36	1152
Infiltration					2434					1335					1461
People	10 X 225				2475	5 X 225				1125	11 X 225				2475
Appliances					150000					12000					
RSCL					162005					16697					9383

Room Name	Display Area (and Hallways)					Server Room				
Plan Size	6 X 42 + 27 X 36					18 X 12				
	D.	U	A	CLTD	BTU/hr	D.	U	A	CLTD	BTU/hr
Wall	E	0.05	301	18	271	E	0.05	273	18	246
	W	0.1	399	18	359					
Ceiling/Floor		0.2	104	9	187		0.2	216	9	389
Door										
Windows	D.		A	CLF		D.		A	CLF	
	W		32	36	1152	W		24	36	864
Infiltration					2838					501
People						2 X 225				450
Appliances										15000
RSCL					4807					17450

**Occupancy for the caretaker's apartment was calculated to accommodate the future conversion to a lab.

Occupancies based on an estimated class size.

Building Total

Sum RSCL = 285446
Duct Gain (5%) = 14272
Duct Gain (5%) = 14272
BSCL = 313991
BTCL = 392489 BTU/hr
Unit Size = 32.7 tons

35 ton unit

Building Total

Sum RSCL =	285446	
Duct Gain (5%) =	14272	
Duct Gain (5%) =	14272	
BSCL =	313991	
BTCL =	392489	BTU/hr
Unit Size =	33	tons
	35 tons unit	

Heating Load Calculations for First Floor

Project: Cobbs Creek Community Environmental Education Center **Out. DB:** 14 F **In. DB:** 72 F
Location: Philadelphia, PA

Room Name	Classroom					Lavatiories					Multipurpose					Information Office				
Plan Size	30 X 35					22 X 11					30 X 26 + 7 X 11					8 X 14				
	D.	U	A	TD	BTU/hr	D.	U	A	TD	BTU/hr	D.	U	A	TD	BTU/hr	D.	U	A	TD	BTU/hr
Wall	E	0.05	511	58	1482	E	0.05	308	58	893	N	0.05	462	58	1340	W	0.05	133	58	386
	S	0.05	462	58	1340						E	0.05	385	58	1117					
	W	0.05	511	58	1482						W	0.05	483	58	1401					
Ceiling/Floor		0.2	1050	58	12180		0.2	242	58	2807		0.2	857	58	9941		0.2	112	58	1299
Door	S	0.5	42	58	1145						N	0.47	42	58	1145					
Windows	E	0.5	56	58	1656	E	0.51	16	58	473	N	0.51	96	58	2840	W	0.51	32	58	947
	W	0.5	56	58	1656						E	0.51	32	58	947					
											W	0.51	32	58	947					
Heat transfer loss					20941					4174					19676					2631
Infiltration	1.1	x A	x B	x TC	BTU/hr	1.1	x A	x B	x TC	BTU/hr	1.1	x A	x B	x TC	BTU/hr	1.1	x A	x B	x TC	BTU/hr
Window	1.1	0.5	174	58	5551	1.1	0.5	29	58	925	1.1	0.5	102	58	3254	1.1	0.5	26	58	829
Door	1.1	1.0	42	58	2680						1.1	1.0	95	58	6061					
Infitration Heat Loss					8230					925					9315					829
Room Heating Load					29172					5099					28991					3461

Room Name	Ranger Office					Meeting Room					Display Area (and Hallways)					Entry				
Plan Size	8 X 14					18 X 12					61 X 6 + 20 X 22					10 X 14				
	D.	U	A	TD	BTU/hr	D.	U	A	TD	BTU/hr	D.	U	A	TD	BTU/hr	D.	U	A	TD	BTU/hr
Wall	W	0.05	133	58	386	W	0.05	252	58	731	E	0.05	329	58	954	W	0.05	140	58	406
Ceiling/Floor		0.2	112	58	1299		0.2	216	58	2506		0.2	806	58	9350		0.2	140	58	1624
Door																W	0.47	21	58	572
Windows	W	0.5	32	58	947	W	0.51	24	58	710	E		32	58	1856					
Heat transfer loss					2631					3946					12160					2602
Infiltration	1.1	x A	x B	x TC	BTU/hr	1.1	x A	x B	x TC	BTU/hr	1.1	x A	x B	x TC	BTU/hr	1.1	x A	x B	x TC	BTU/hr
Window	1.1	0.5	26	58	829	1.1	0.5	58	58	1850										
Door																1.1	1.0	21	58	1340
Infitration Heat Loss					829					1850										1340
Room Heating Load					3461					5797					12160					3942

Heating Load Calculations for Second Floor

Project: Cobbs Creek Community Environmental Education Center **Out. DB:** 14 F **In. DB:** 72 F
Location: Philadelphia, PA

Room Name	Computer Lab					Caretaker's Apartment					General Lab				
Plan Size	30 X 35					12 X 48					35 X 18				
	D.	U	A	TD	BTU/hr	D.	U	A	TD	BTU/hr	D.	U	A	TD	BTU/hr
Wall	E	0.05	511	58	1482	E	0.05	693	58	2010	N	0.05	273	58	792
	S	0.05	462	58	1340						W	0.05	511	58	1482
	W	0.05	511	58	1482										
Ceiling/Floor		0.2	1050	58	12180		0.2	576	58	6682		0.2	630	58	7308
Door															
Windows	E	0.5	56	58	3248	E	0.51	16	58	928	N	0.51	96	58	5568
	W	0.5	56	58	3248						E	0.51	32	58	1856
											W	0.51	32	58	1856
Heat transfer loss					22980					9619					18862
Infiltration	1.1	x A	x B	x TC	BTU/hr	1.1	x A	x B	x TC	BTU/hr	1.1	x A	x B	x TC	BTU/hr
Window	1.1	0.5	44	58	1404	1.1	0.5	29	58	925	1.1	0.5	58	58	1850
Door															
Infitration Heat Loss					1404					925					1850
Room Heating Load					24383					10544					20712

Room Name	Display Area (and Hallways)					Server Room				
Plan Size	6 X 42 + 27 X 36					18 X 12				
	D.	U	A	TD	BTU/hr	D.	U	A	TD	BTU/hr
Wall	E	0.05	301	58	873	E	0.05	273	58	792
	W	0.1	399	58	1157					
Ceiling/Floor		0.2	104	58	1206		0.2	216	58	2506
Door										
Windows	D.		A	CLF		D.		A	CLF	
	W		32	36	1152	W		24	36	864
Infiltration	1.1	x A	x B	x TC	BTU/hr	1.1	x A	x B	x TC	BTU/hr
Window						1.1	0.5	15	58	479
Door										
Infitration Heat Loss										479
Room Heating Load					1152					1343

Appendix III.C.4
HVAC Sizing

Diffuser Sizing

Room	Square Footage	CFM	Diffuser Size (in,)	Flow Rate (cfm)	Radius of Diffusion (ft)	# of Diffusers
First Floor:						
Male Lavatory	121	242	8	280	9	1
Female Lavatory	121	242	8	280	9	1
Multipurpose Room	780	1560	16	980	15	2
Corridor (1st floor)	366	732	10	435	11	2
Display Area/Entry	580	1160	12	630	13	2
Ranger's Office	112	224	8	280	9	1
Information Office	112	224	8	280	9	1
Meeting Room	240	480	10	490	12	1
Classroom	1080	2160	16	980	15	4
Second Floor:						
Computer Lab	1080	2160	16	980	15	4
Server Room	240	480	10	490	12	1
General Lab	630	1260	12	705	15	2
Display Area	972	1944	12	630	13	4
Corridor (2nd floor)	252	504	8	315	10	2
Caretaker's Apartmen	576	1152	10	435	11	3

**Only 70% of the diffusion radius is used when the diffuser is mounted on exposed duct.

Appendix III.C.4
HVAC Sizing

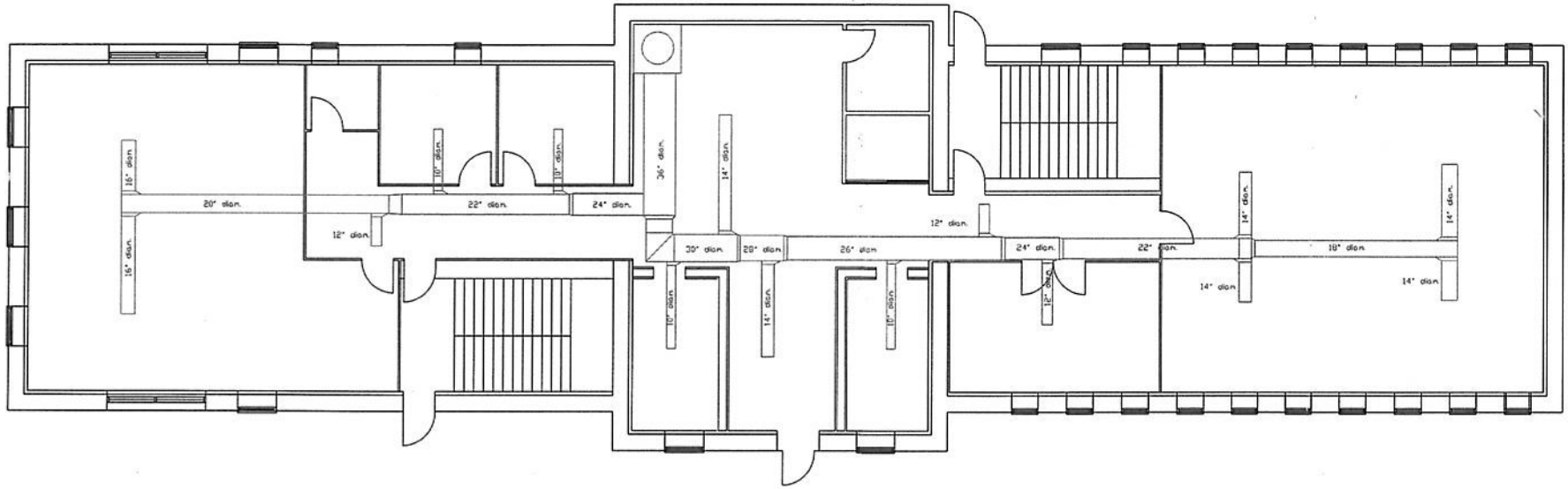
Duct Sizing - Equal Friction Method - First Floor

Segment	Length	CFM	V (ft/min)	Friction Loss	Duct Diamter (in.)
First Floor:					
Fan - A1	24	14308	1295	0.045	45
A1 - A	12	6916	978	0.045	36
A - B	9	2410	767	0.045	24
RO-1	6	242	444	0.045	10
B - C	12	2168	821	0.045	22
RO-2	6	242	444	0.045	10
C - D	3	1926	730	0.045	22
RO-3	3	366	466	0.045	12
D - E	23	1560	715	0.045	20
RO-4	5	780	559	0.045	16
RO-5	11	780	559	0.045	16
A - F	21	4506	918	0.045	30
RO-6	8	224	411	0.045	10
F - G	7	4282	872	0.045	30
RO-7	11	580	543	0.045	14
G - H	4	3702	866	0.045	28
RO-8	10	580	543	0.045	14
H - I	11	3122	847	0.045	26
RO-9	8	224	411	0.045	10
I - J	10	2898	786	0.045	26
RO-10	3	366	466	0.045	12
J - K	5	2532	806	0.045	24
RO-11	7	432	550	0.045	12
K - L	18	2100	796	0.045	22
RO-12	7	525	491	0.045	14
RO-13	4	525	491	0.045	14
L - M	18	1050	594	0.045	18
RO-14	7	525	491	0.045	14
RO-15	4	525	491	0.045	14

Appendix III.C.4
HVAC Sizing

Duct Sizing - Equal Friction Method - Second Floor

Segment	Length	CFM	V (ft/min)	Friction Loss	Duct Diamter (in.)
Second Floor:					
A1 - A2	25	7392	1046	0.045	36
A2 - N	38	2664	848	0.045	24
RO-16	3	252	462	0.045	10
N - O	8	2412	768	0.045	24
RO-17	5	384	489	0.045	12
O - P	12	2028	768	0.045	22
RO-18	8	630	589	0.045	14
P - Q	6	1398	791	0.045	18
RO-19	5	384	489	0.045	12
Q - R	12	1014	574	0.045	18
RO-20	8	630	589	0.045	14
R - S	2	384	489	0.045	12
RO-21	5	384	489	0.045	12
A2 - T	35	4728	963	0.045	30
RO-22	9	486	455	0.045	14
T - U	2	4242	864	0.045	30
RO-23	8	486	455	0.045	14
U -V	7	3756	878	0.045	28
RO-24	9	486	455	0.045	14
V - W	2	3270	887	0.045	26
RO-25	8	486	455	0.045	14
W - X	20	2784	886	0.045	24
RO-26	2	252	462	0.045	10
X - Y	3	2532	806	0.045	24
RO-27	7	432	550	0.045	12
Y - Z	16	2100	796	0.045	22
RO-28	7	525	491	0.045	14
RO-29	4	525	491	0.045	14
Z - AA	18	1050	594	0.045	18
RO-30	7	525	491	0.045	14
RO-31	4	525	491	0.045	14



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KABR Associates

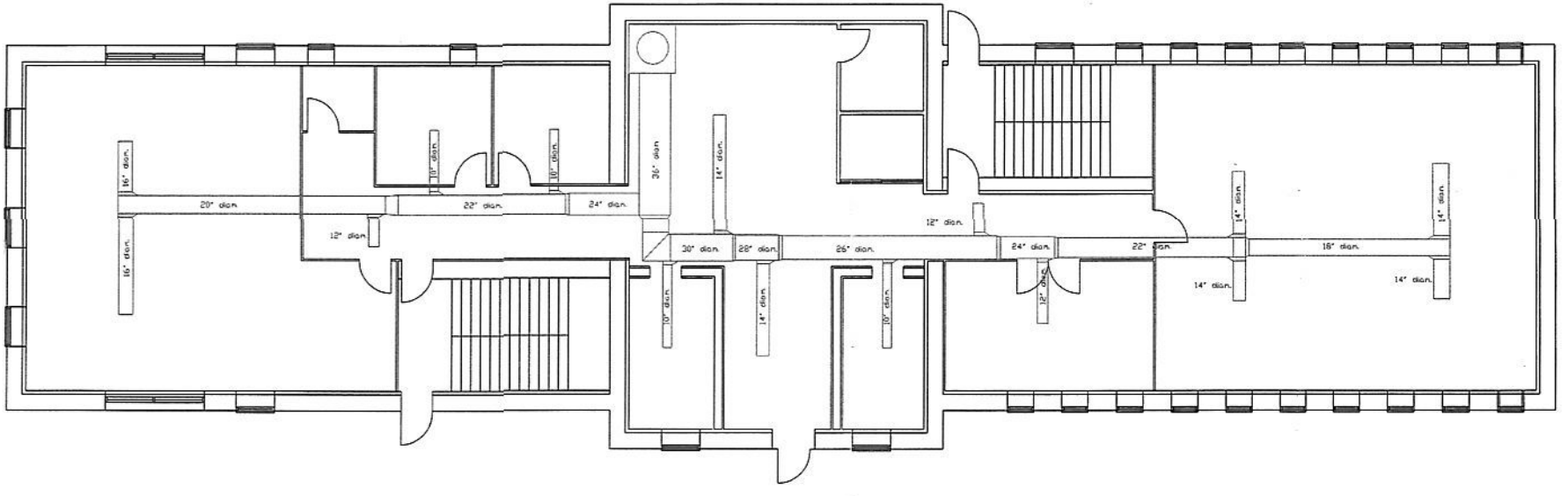
Scale: 1/10" = 1'

26 MAY 2000

FIRST FLOOR MECHANICAL

M-1

App III.C.5.b



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

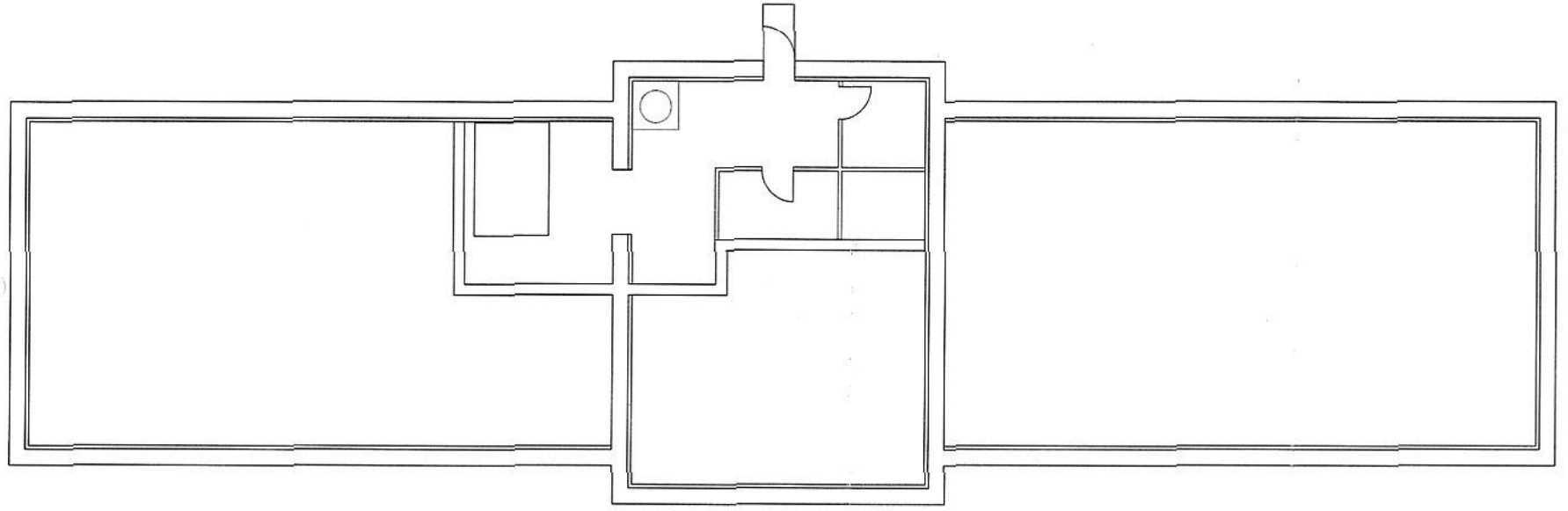
KABR Associates

Scale:
1/10" = 1'

26 MAY 2000

SECOND FLOOR
MECHANICAL

M-2



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

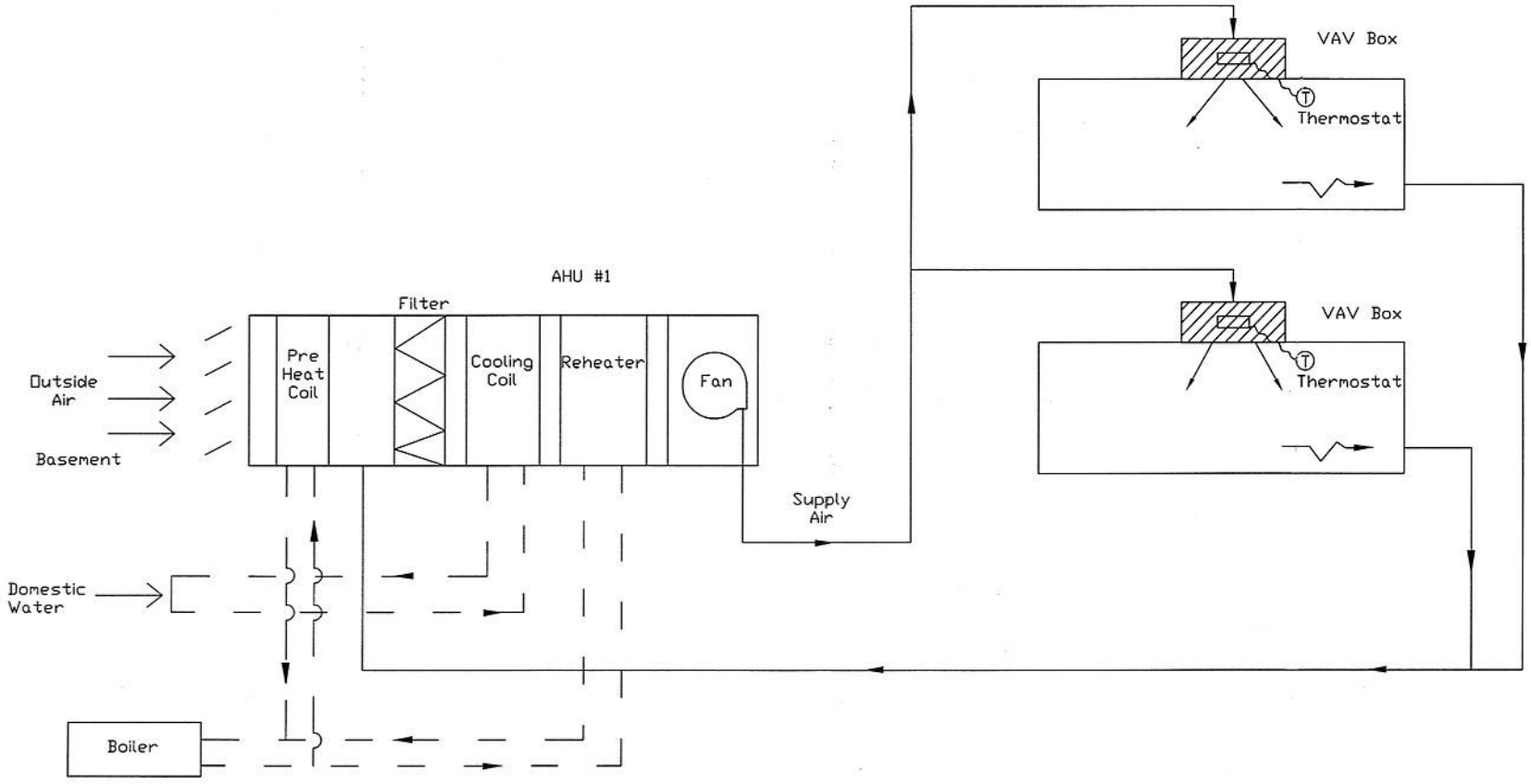
KABB Associates

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
MECHANICAL

M-3



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KABD Associates

Scale:
NO SCALE

26 MAY 2000

MECHANICAL
LINE DIAGRAM

M-4

Appendix III.C.6.a
HVAC System Matrix

Property	Weighting	HVAC Systems				
		VAV	VAV Reheat	Hydronic Converter	Radiant Heating	Terminal Units
Safety	3	2	2	2	2	2
Minimum first cost	3	1	1	1	1	2
Minimum operating cost	3	2	1	2	1	1
Maximum control over temperature	2	2	2	1	1	2
Minimum system noise	1	2	2	2	2	1
Minimum floor space occupied	2	1	1	2	2	2
Minimum maintenance	2	2	1	2	2	1
		27	22	27	24	26

PRODUCTS

◀ PRODUCT INDEX

50BVV Indoor Packaged Cooling - Water Cooled Variable Air Volume System

Physical Data - English Units GO

Physical Data - English Units:

PERFORMANCE AND SIZING INFORMATION

TONS	TC BTUH	EVAPORATOR AIR FLOW	GROSS COOL	GPM	WEIGHT	FAN HP	DIMENSION (IN)		
							WIDTH	DEPTH	HEIGHT
		CFM	(BTUH)		LBS		in.	in.	in.
2 0	240,000	8 ,000	291,000	60	1,909	5	8 0	3 2	62
2 5	300,000	10,000	301,000	75	1,505	7 .5	8 0	3 2	79
3 0	360,000	12,000	370,000	90	1,595	1 0	8 0	3 2	79
3 5	420,000	14,000	445,000	105	2,132	1 0	1 09	4 2	85
4 0	480,000	16,000	520,000	120	2,205	1 5	1 09	4 2	85
4 5	540,000	18,000	585,000	135	2,443	1 5	1 09	4 2	85
5 0	600,000	20,000	650,000	150	2,491	2 0	1 38	4 2	85
6 0	720,000	24,000	729,000	180	3,295	2 5	1 38	4 2	85

ELECTRICAL DATA

TONS	EVAP HP	208/230		460	
		MCA	MOCP	MCA	MOCP
20	5	101.4	125	48.7	60
25	7.5	128.3	150	60.5	70
30	10	147.6	175	77.5	100
35	10	175.3	200	87.4	110
40	15	217.5	250	103.9	125
45	15	236.8	300	112.5	150
50	20	269	300	126.5	150
60	25	306.1	400	148.4	172

APPENDIX III.C.6.b

Appendix III.D

Electrical

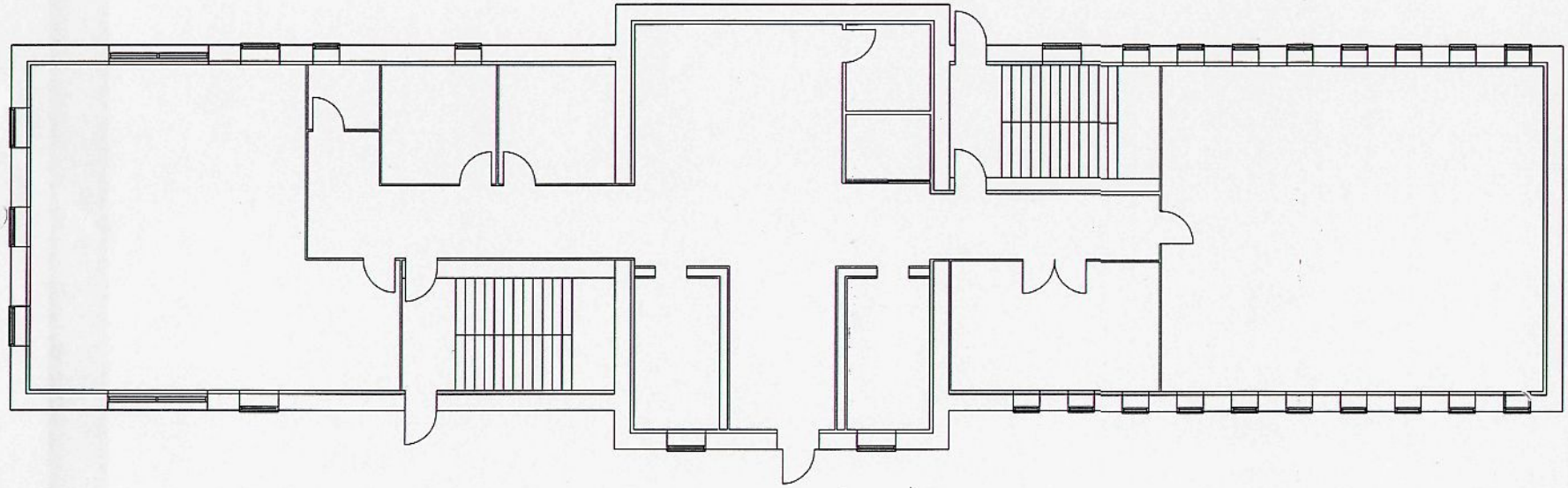
1. Electrical loads
2. Plans
   a. E-1 First floor electrical
   b. E-2 Second floor electrical
   c. E-3 Basement electrical
   d. E-4 Electrical line diagram

Appendix III.D.1
Electrical Loads

Electrical Load Calculations

Space	Sq. ft.	Lighting	Volts	Miscellaneous	Volts	Air Conditioning	Volts	Plumbing	Volts	
Offices	224	1.5	336	2.5	560	5.0	1120	1.0	224	
Meeting Rooms	240	1.5	360	2.5	600	5.0	1200	1.0	240	
Display Areas	1552	2.0	3104	0.5	776	6.0	9312	1.2	1862	
Corridors	618	0.5	309		0		0		0	
Multipurpose Room	780	2.0	1560	0.5	390	6.0	4680	1.2	936	
General Lab	630	2.5	1575	1.5	945	8.0	5040	1.6	1008	
Bathroom	242	3.0	726	0.5	121		0		0	
Classroom	1080	2.5	2700	2.0	2160	4.0	4320	0.8	864	
Computer Lab	1080	2.1	2268	2.5	2700	15.0	16200	3.0	3240	
Server Room	240	1.5	360	2.5	600	5.0	1200	1.0	240	
Caretaker's Apt	576	3	1728	0.5	288		0		0	
Closets	128	0.5	64		0		0		0	
StairWells	960	0.5	480		0		0		0	
Totals			15570		9140		43072		8614	76396

Min. 77 kVA transformer



NOTES:

1. SEE ELECTRICAL LINE DIAGRAM FOR ELECTRICAL INFORMATION.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

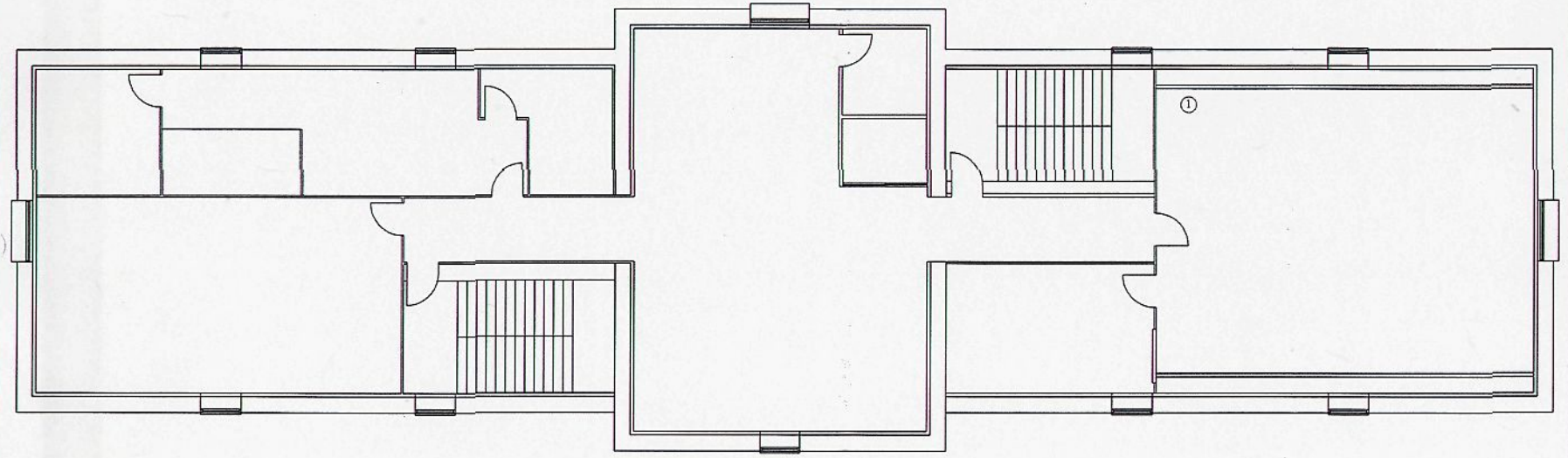
KAHR Associates

Scale:
1/10" = 1'

26 MAY 2000

FIRST FLOOR
ELECTRICAL

E-1



NOTES:

1. CHASES WILL HAVE ALL COMPUTER WIRES RUNNING THROUGH THEM.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

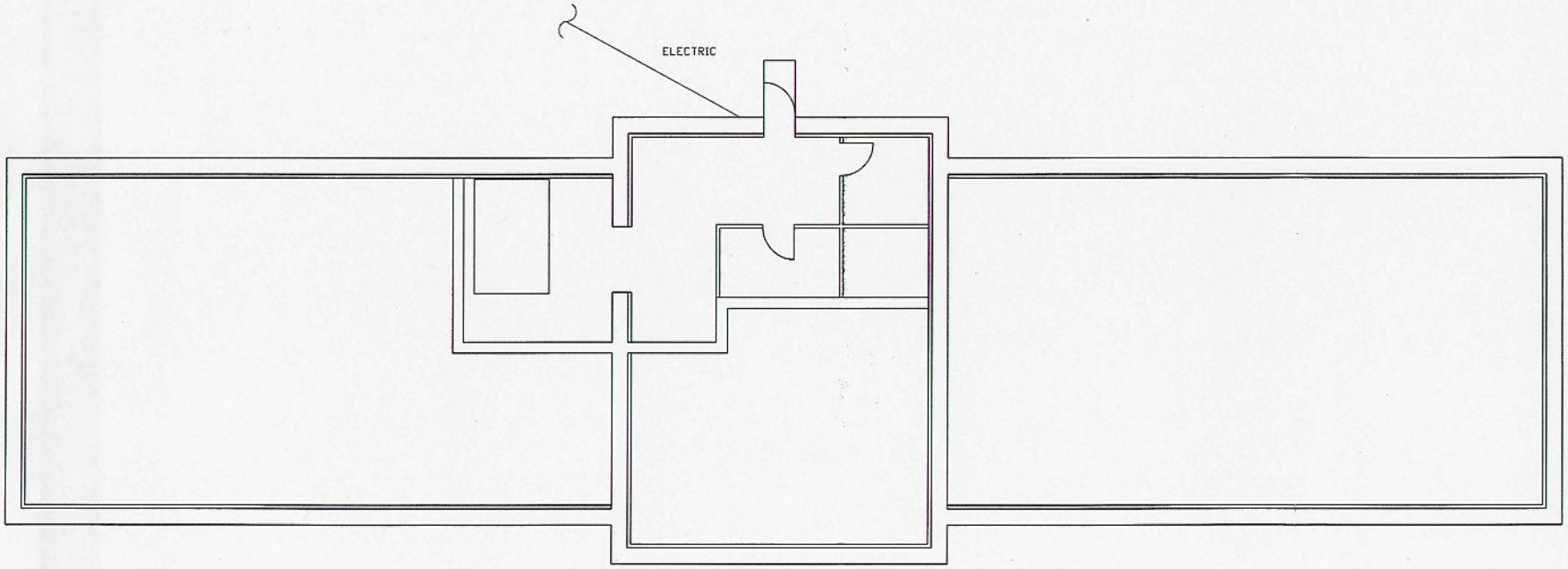
KLAHR Associates

Scale: 1/8" = 1'

26 MAY 2000

SECOND FLOOR ELECTRICAL

E-2



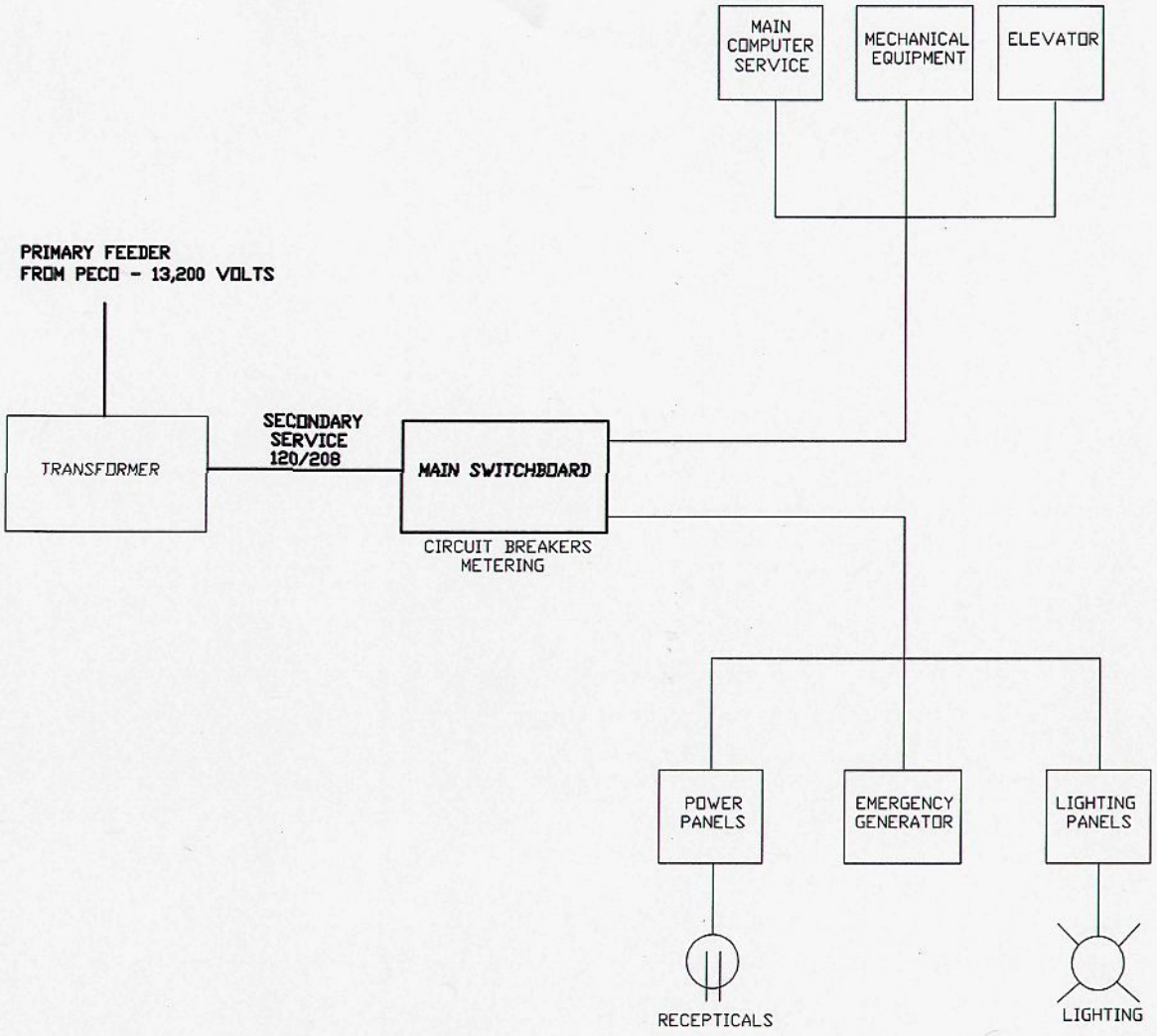
COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
ELECTRICAL

E-3



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KCBA Associates

Scale:
NO SCALE

26 MAY 2000

ELECTRICAL
LINE DIAGRAM

E-4

Appendix III.E
Lighting

1. Lighting calculations
2. Plans
   a. L-1 First floor lighting
   b. L-2 Second floor lighting
   c. L-3 Basement lighting

Appendix III.E.1
Lighting Calculations

Lighting - Zonal Cavity Method

Reflectance:
wall = 50%
Ceiling = 50%
Floor = 30%

Ceiling Height (CH) = 12 ft
Work Surface = 2.5 ft
ng Loss Factor (LLF) = 70%

Offices: Area Dimensions: 8' x 14'
Footcandles (fc) = 50

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(8 + 14)}{(8 \times 14)} = \mathbf{9.3}$$

CU:

RCR	CU	
9	36	
9.3	---------->	**35.1**
10	33	

$$\#\ of\ luminaires = \frac{(fc)\,(area)}{\text{imens/lamp})\,(Lamps/Luminaire)\,(CU)\,(LL}$$

$$\#\ of\ luminaires = \frac{(50)\,(8)\,(14)}{(2950)\,(3)\,(0.351)\,(0.7)} = \mathbf{3\ luminaires}$$

Entry: Area Dimensions: 10' x 14'
Footcandles (fc) = 30

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(10 + 14)}{(10 \times 14)} = \mathbf{8.1}$$

CU:

RCR	CU	
8	39	
8.1	---------->	**38.7**
9	36	

$$\#\ of\ luminaires = \frac{(fc)\,(area)}{\text{imens/lamp})\,(Lamps/Luminaire)\,(CU)\,(LL}$$

$$\#\ of\ luminaires = \frac{(30)\,(10)\,(14)}{(2950)\,(3)\,(0.387)\,(0.7)} = \mathbf{2\ luminaires}$$

Display Area (first floor): Area Dimensions: 20' x 22'
Footcandles (fc) = 20

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(20 + 22)}{(20 \times 22)} = \mathbf{4.5}$$

CU:

RCR	CU	
4	56	
4.5	---------->	**53.5**
5	51	

$$\#\ of\ luminaires = \frac{(fc)\,(area)}{\text{imens/lamp})\,(Lamps/Luminaire)\,(CU)\,(LL}$$

$$\#\ of\ luminaires = \frac{(20)\,(20)\,(22)}{(2950)\,(3)\,(0.535)\,(0.7)} = \mathbf{3\ luminaires\ ------>\ use\ 4}$$

Appendix III.E.1
Lighting Calculations

Multipurpose Room: Area Dimensions: 26' x 30'
Footcandles (fc) = 50

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(26 + 30)}{(26 \times 30)} = \mathbf{3.4}$$

CU:

RCR	CU	
3	61	
3.4	---------->	**59**
4	56	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lumens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(50)\,(26)\,(30)}{(2950)\,(3)\,(0.59)\,(0.7)} = \mathbf{11\ luminaires\ ------>\ use\ 12}$$

Meeting Room: Area Dimensions: 18' x 12'
Footcandles (fc) = 50

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(18 + 12)}{(18 \times 12)} = \mathbf{6.6}$$

CU:

RCR	CU	
6	47	
6.6	---------->	**44.6**
7	43	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lumens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(50)\,(18)\,(12)}{(2950)\,(3)\,(0.446)\,(0.7)} = \mathbf{4\ luminaires}$$

Bathrooms: Area Dimensions: 11' x 11'
Footcandles (fc) = 30

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(11 + 11)}{(11 \times 11)} = \mathbf{8.6}$$

CU:

RCR	CU	
8	39	
8.6	---------->	**37.2**
9	36	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lumens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(30)\,(11)\,(11)}{(2950)\,(3)\,(0.372)\,(0.7)} = \mathbf{2\ luminaires}$$

Appendix III.E.1
Lighting Calculations

Classroom: Area Dimensions: 35' x 30'
Footcandles (fc) = 50

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(35 + 30)}{(35 \times 30)} = \mathbf{2.9}$$

CU:

RCR	CU	
2	67	
2.9	---------->	**61.6**
3	61	

$$\#\ of\ luminaires = \frac{(fc)\,(area)}{\text{ımens/lamp})\,(Lamps/Luminaire)\,(CU)\,(LL}$$

$$\#\ of\ luminaires = \frac{(50)\,(35)\,(30)}{(2950)\,(3)\,(0.616)\,(0.7)} = \mathbf{14\ luminaires\ ------>\ use\ 15}$$

Computer Lab: Area Dimensions: 35' x 30'
Footcandles (fc) = 50

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(35 + 30)}{(35 \times 30)} = \mathbf{2.9}$$

CU:

RCR	CU	
2	67	
2.9	---------->	**61.6**
3	61	

$$\#\ of\ luminaires = \frac{(fc)\,(area)}{\text{ımens/lamp})\,(Lamps/Luminaire)\,(CU)\,(LL}$$

$$\#\ of\ luminaires = \frac{(50)\,(35)\,(30)}{(2950)\,(3)\,(0.616)\,(0.7)} = \mathbf{14\ luminaires\ ------>\ use\ 15}$$

Server Room: Area Dimensions: 18' x 12'
Footcandles (fc) = 50

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(18 + 12)}{(18 \times 12)} = \mathbf{6.6}$$

CU:

RCR	CU	
6	47	
6.6	---------->	**44.6**
7	43	

$$\#\ of\ luminaires = \frac{(fc)\,(area)}{\text{ımens/lamp})\,(Lamps/Luminaire)\,(CU)\,(LL}$$

$$\#\ of\ luminaires = \frac{(50)\,(18)\,(12)}{(2950)\,(3)\,(0.446)\,(0.7)} = \mathbf{4\ luminaires}$$

Appendix III.E.1
Lighting Calculations

General Lab: Area Dimensions: 35' x 18'
Footcandles (fc) = 50

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(35 + 18)}{(35 \times 18)} = \mathbf{3.2}$$

CU:

RCR	CU	
3	61	
3.2	---------->	**60**
4	56	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lumens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(50)\,(35)\,(18)}{(2950)\,(3)\,(0.6)\,(0.7)} = \mathbf{9\ luminaires\ ------>\ use\ 10}$$

First Floor North Corridor: Area Dimensions: 32' x 6'
Footcandles (fc) = 20

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(32 + 6)}{(32 \times 6)} = \mathbf{9.4}$$

CU:

RCR	CU	
9	36	
9.4	---------->	**34.2**
10	33	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lumens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(20)\,(32)\,(6)}{(2950)\,(3)\,(0.342)\,(0.7)} = \mathbf{2\ luminaires}$$

First Floor South Corridor: Area Dimensions: 29' x 6'
Footcandles (fc) = 20

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(29 + 6)}{(29 \times 6)} = \mathbf{9.6}$$

CU:

RCR	CU	
9	36	
9.6	---------->	**34.2**
10	33	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lumens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(20)\,(29)\,(6)}{(2950)\,(3)\,(0.342)\,(0.7)} = \mathbf{2\ luminaires}$$

Appendix III.E.1
Lighting Calculations

Display Area (second floor): Area Dimensions: 36' x 27'
Footcandles (fc) = 20

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(36 + 27)}{(36 \times 27)} = \mathbf{3.1}$$

CU:

RCR	CU	
3	61	
3.1	---------->	**60.5**
4	56	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lumens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(20)\,(36)\,(27)}{(2950)\,(3)\,(0.605)\,(0.7)} = \mathbf{6\ luminaires}$$

Second Floor North & South Corridors: Area Dimensions: 21' x 6'
Footcandles (fc) = 20

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(21 + 6)}{(21 \times 6)} = \mathbf{8.0}$$

CU:

RCR	CU
8	39

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lumens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(20)\,(21)\,(6)}{(2950)\,(3)\,(0.39)\,(0.7)} = \mathbf{1\ luminaires\ ------>use\ 2}$$

Caretaker's Bathroom: Area Dimensions: 12' x 8'
Footcandles (fc) = 30

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(12 + 8)}{(12 \times 8)} = \mathbf{7.8}$$

CU:

RCR	CU	
7	43	
7.8	---------->	**39.8**
8	39	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lumens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(30)\,(12)\,(8)}{(2950)\,(3)\,(0.398)\,(0.7)} = \mathbf{1\ luminaire}$$

Appendix III.E.1
Lighting Calculations

Caretaker's Bedroom: Area Dimensions: 12' x 12'
Footcandles (fc) = 30

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(12 + 12)}{(12 \times 12)} = \mathbf{6.3}$$

CU:

RCR	CU	
6	47	
6.3	---------->	**45.8**
7	43	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lmens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(30)\,(12)\,(12)}{(2950)\,(3)\,(0.458)\,(0.7)} = \mathbf{2\ luminaires}$$

Caretaker's Kitchen/Living Room: Area Dimensions: 12' x 28'
Footcandles (fc) = 30

$$RCR = \frac{5\,(CH - Wk.\ Surface)\,(L + W)}{(L \times W)}$$

$$RCR = \frac{5\,(12 - 2.5)\,(12 + 28)}{(12 \times 28)} = \mathbf{4.5}$$

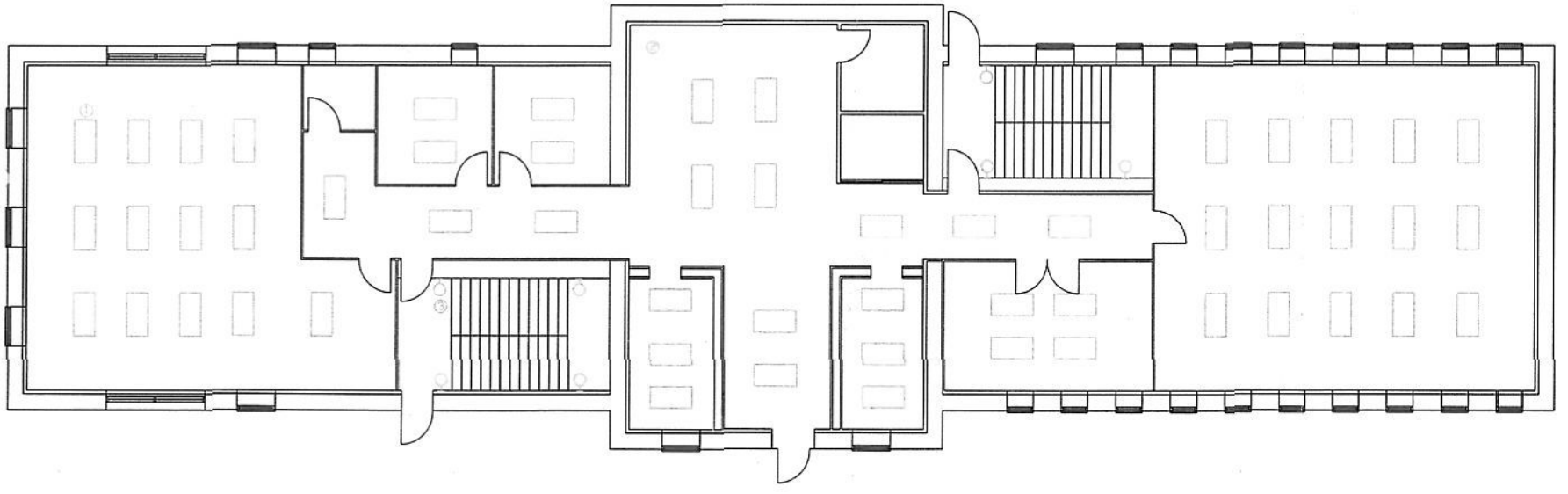
CU:

RCR	CU	
4	56	
4.5	---------->	**53.5**
5	51	

$$\#\ \text{of luminaires} = \frac{(fc)\,(area)}{\text{lmens/lamp})\,(\text{Lamps/Luminaire})\,(CU)\,(LL}$$

$$\#\ \text{of luminaires} = \frac{(30)\,(12)\,(28)}{(2950)\,(3)\,(0.535)\,(0.7)} = \mathbf{3\ luminaires}$$

**Footcandles in the caretaker's apartment are the same as those used in the laboratory in order to take into account future conversion to an additional laboratory.



NOTES:

1. ALL LIGHTS WILL BE 2'X4' T-8 LUMINAIRES.
2. DISPLAY LIGHTING WILL BE IN DISPLAY FIXTURES.
3. STAIRWELL LIGHTING WILL BE WALL MOUNTED FIXTURES.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

KABR Associates

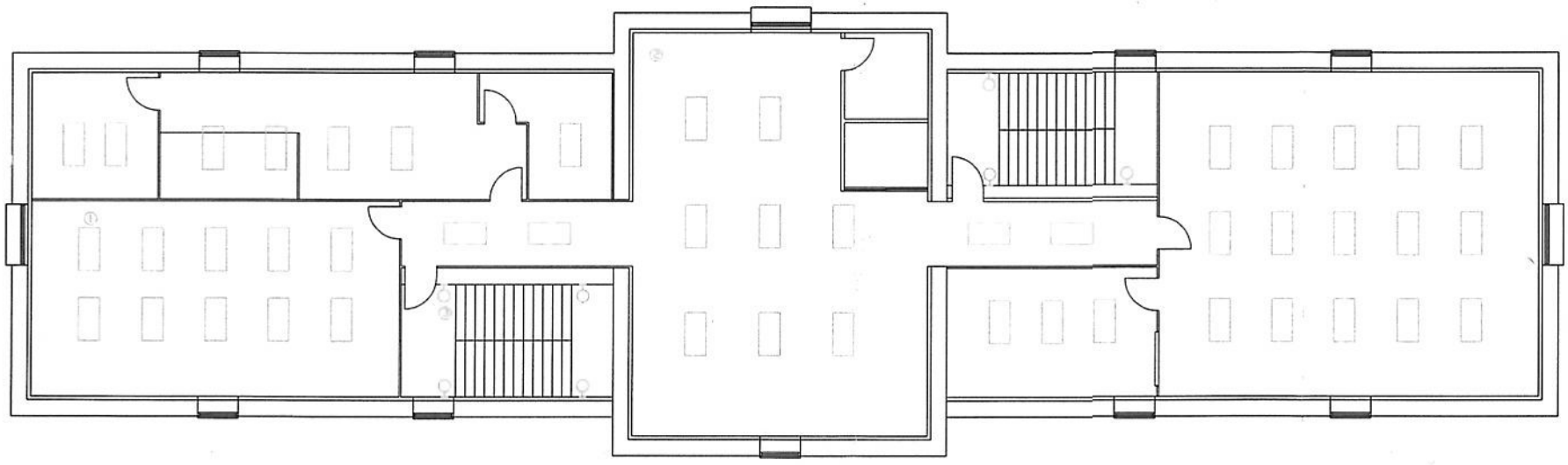
Scale: 1/10" = 1'

26 MAY 2000

FIRST FLOOR LIGHTING

L-1

App III.E.2.b



NOTES:

1. ALL LIGHTS WILL BE 2'X4' T-8 LUMINAIRES.
2. DISPLAY LIGHTING WILL BE IN DISPLAY FIXTURES.
3. STAIRWELL LIGHTING WILL BE WALL MOUNTED FIXTURES.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

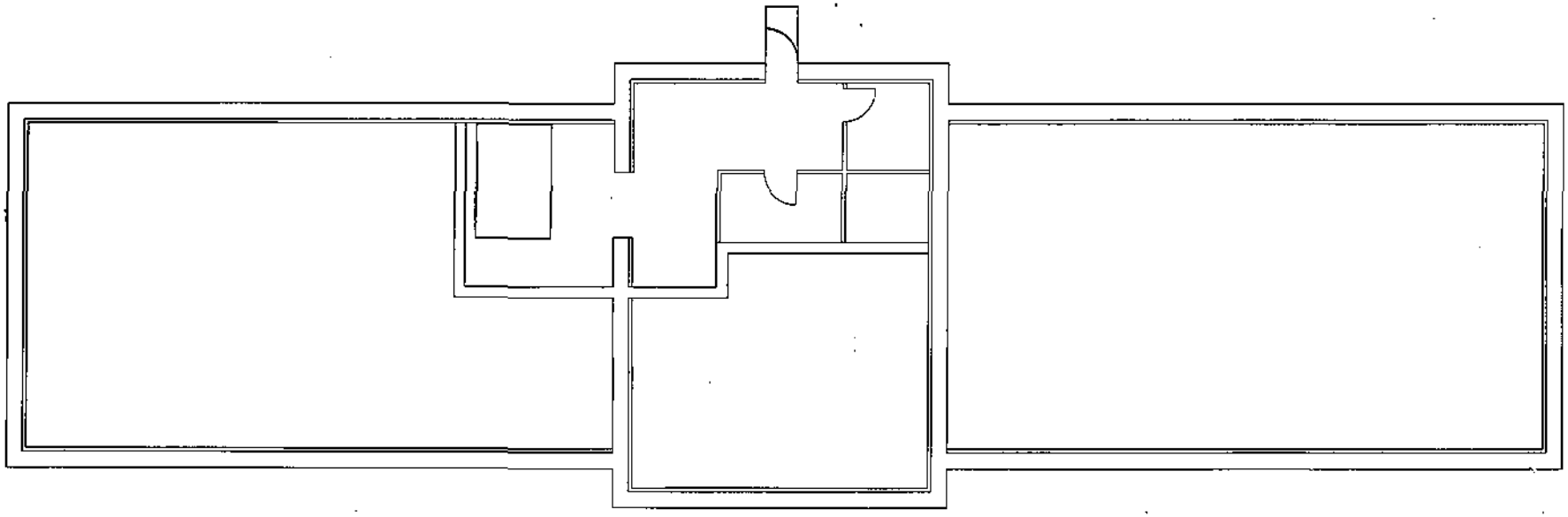
KABR Associates

Scale:
1/10' = 1'

26 MAY 2000

SECOND FLOOR LIGHTING

L-2



NOTES:

1. LIGHTING WILL BE DETERMINED IN THE FIELD.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
1/10' = 1'

26 MAY 2000

BASEMENT LIGHTING

L-3

Appendix III.F

Plumbing

1. Plumbing calculations
2. Plans
   a. P-1 First floor plumbing
   b. P-2 Second floor plumbing
   c. P-3 Basement plumbing
   d. P-4 Plumbing line diagram

Appendix III.F.1
Plumbing Calculations

Plumbing - Total Fixture Units

Fixture	# of fixtures	Wt. In fixture units	Total Fixture Units
First Floor:			
Water Closets	4	10	40
Wall Urinal	1	5	5
Sinks	4	2	8
Janior's Sink	1	3	3
Sink in Multipurpose Room	1	3	3
Second Floor:			
Laboratory Sinks	6	2	12
Caretaker's Apartment:			
Kitchen Sink	1	3	3
Stall Shower (mixing valve)	1	2	2
Water Closet	1	10	10
Sink	1	2	2
Total			88

Appendix III.F.1
Plumbing Calculations

Plumbing - Verifying adequacy of existing 4 inch water service

Assuming minimum street main pressure =	50	psi	
Height of topmost fixture =	18	ft	
Topmost fixture type =	Basin faucet (lab sinks)		
Fixture units =	88		
Developed length of piping =	64	ft	
Pipe length equivalent to fittings =	32	ft	(50% of development length)
System uses predominantly flush valves			

Fixture Pressure =	15	psi	
Static Head =	8	psi	(18) x (0.433)
Pressure loss in meter =	5	psi	Estimated from Fig. 9.48 (MEEBS)
	28	psi	
Pressure in main =	50	psi	
-	28	psi	
	22	psi	

Unit friction loss:
22 psi x [(64/(64+32)] = 14.67 psi/100 ft

Flush valve with 88 fixture units ----> 65 gpm

65 gpm and 14.67 psi/100 ft ----> diameter = 1 1/2 to 2 inch
velocity = 9.75 ft/sec

Therefore, existing water service of 4 inches is adequate for this system

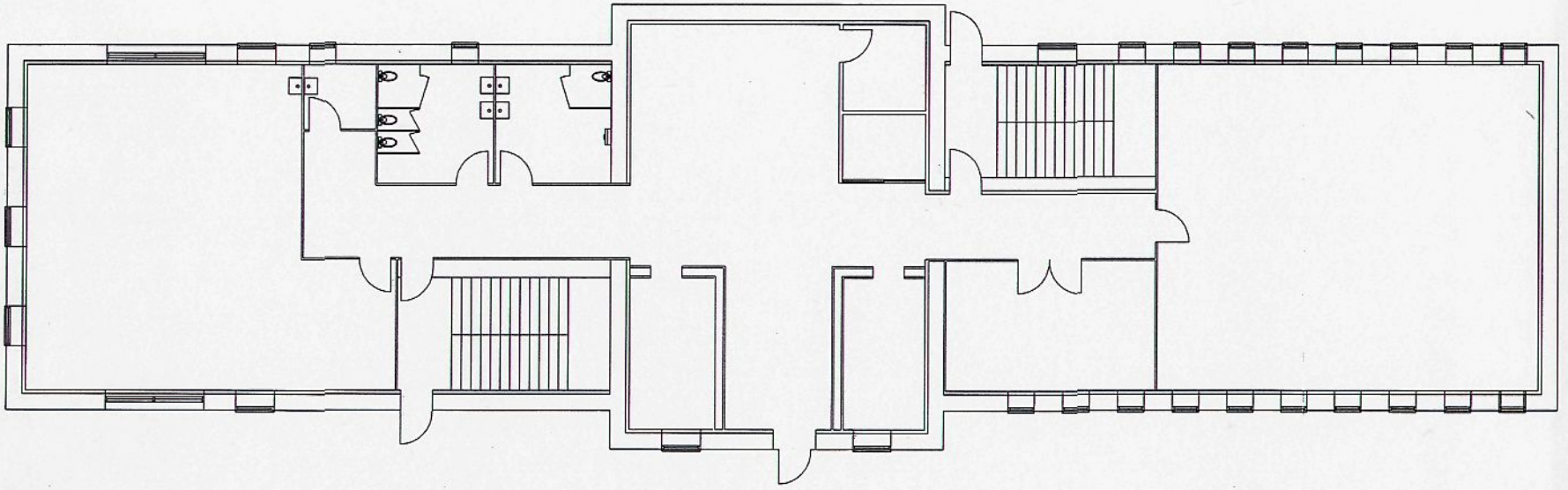
Appendix III.F.1
Plumbing Calculations

Plumbing - Trap Sizes for Waste Piping

Fixture	Number of fixtures	Trap sizes
First Floor:		
Water Closet	4	4 in.
Wall Urinal	1	4 in.
Sinks	4	1 1/4 in.
Janitor's Sink	1	1 1/2 in.
Sink in Multipurpose Room	1	1 1/2 in.
Second Floor:		
Lab Sinks	6	1 1/2 in.
Kitchen Sink	1	1 1/2 in.
Stall Shower	1	2 in.
Water Closet	1	4 in.
Sink	1	1 1/4 in.
Floor Drains	6	2 in.

Plumbing - Water Supply

Fixture	Supply Pipe Sizes
Water Closet	1 in. (cold)
Wall Urinal	3/4 in. (cold)
Sinks	1/2 in. (hot and cold)
Shower	1in. (hot and cold)



NOTES:

1. ALL FIXTURES TO BE SPECIFIED AT A LATER DATE.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

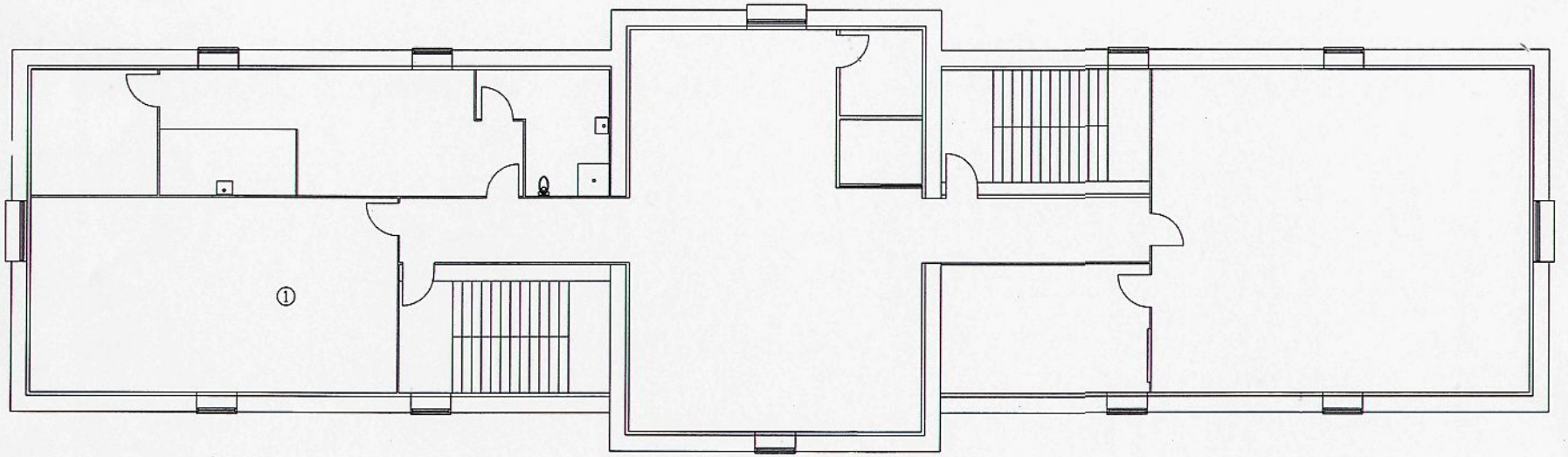
KABB Associates

Scale:
1/10" = 1'

26 MAY 2000

FIRST FLOOR
PLUMBING

P-1



NOTES:

1. 6 SINKS WILL BE ADDED TO THE GENERAL LABORATORY WHEN LAB TABLES ARE BROUGHT IN.
2. ALL FIXTURES TO BE SPECIFIED AT A LATER DATE.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

Associates

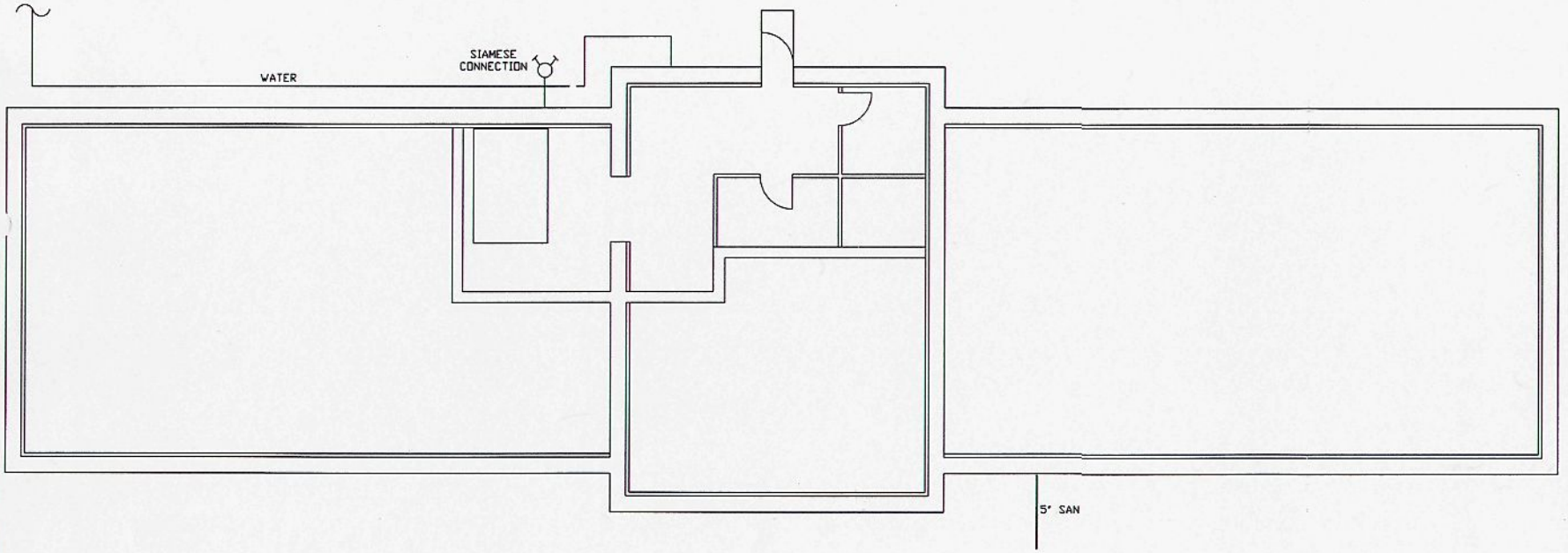
Scale:
1/10" = 1'

26 MAY 2000

SECOND FLOOR
PLUMBING

P-2

App III.F.2.c



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

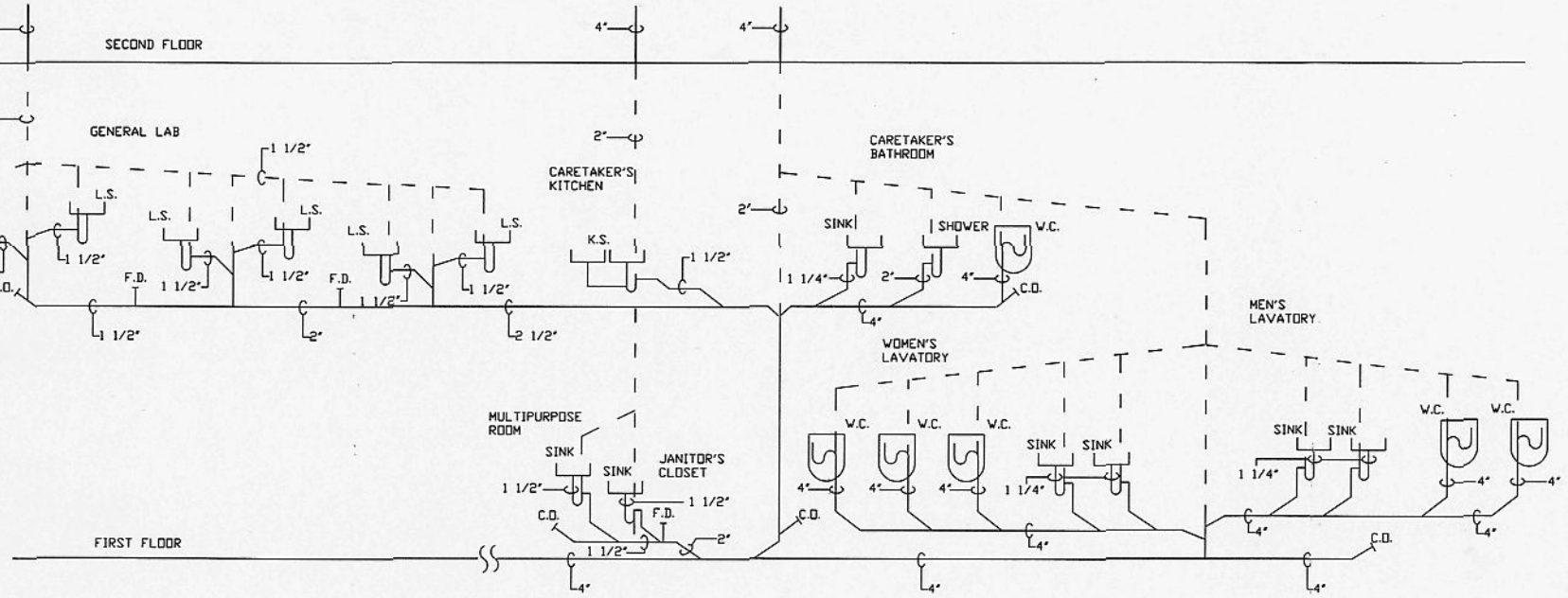
NORTH

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
PLUMBING

P-3



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KMB Associates

Scale: NONE

26 MAY 2000

PLUMBING LINE DIAGRAM

P-4

Appendix III.G

Fire Protection

1. Fire protection calculations
2. Plans
   a. P-1 First floor plumbing
   b. P-2 Second floor plumbing
   c. P-3 Basement plumbing
   d. P-4 Plumbing line diagram

Appendix III.G.1
Fire Protection Calculations

Fire Protection - Occupancy

Space	ft2/person	Square footage	People
General Lab	20	630	30
Classroom	20	1080	35
Computer Lab	20	1080	35
Caretaker's Apartment	20	576	25
Multipurpose Room	15	780	50
Meeting Room	15	240	14
Ranger's Office	100	112	1
Information Office	100	112	1
Total Occupancy			**191**

Fire Protection - Nmber of Exits

Doors to outside:

100 persons/door ---------> 2 doors

Fire Protection - Fire-Rated Doors

Class B - staires, elevator shafts, mechanical chases - 1 to 1 1/2 hours

Fire Protection - SprinkerInformation

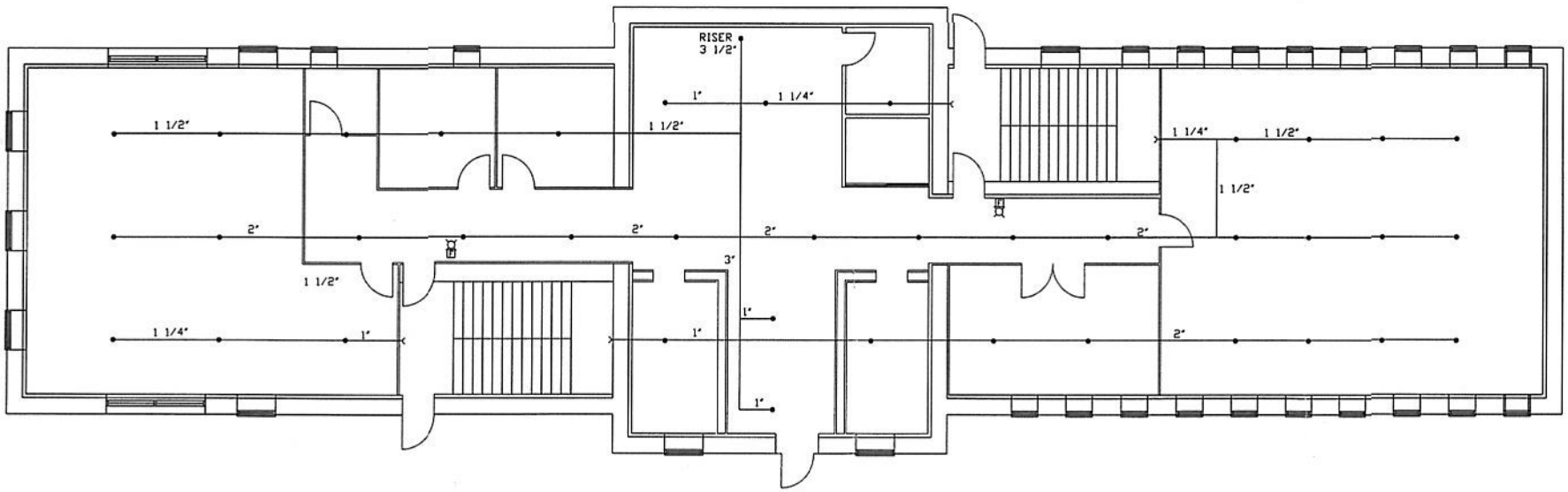
Protection area per sprnkler with exposed construction < 130 ft2
Maximum distance between sporinklers = 15 ft
Required flow rates = 0.1 gpm/ft2

Orifice sizes are standard 1/2 inch

Supply parameters at highest sprinkler:

Residual pressure required = 15 psi
Acceptable from at base of riser = 500-700 gpm
Required duration - 30-60 minutes

Minimum tank capacity = (700 gpm) (60 min) = 42000 gal



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

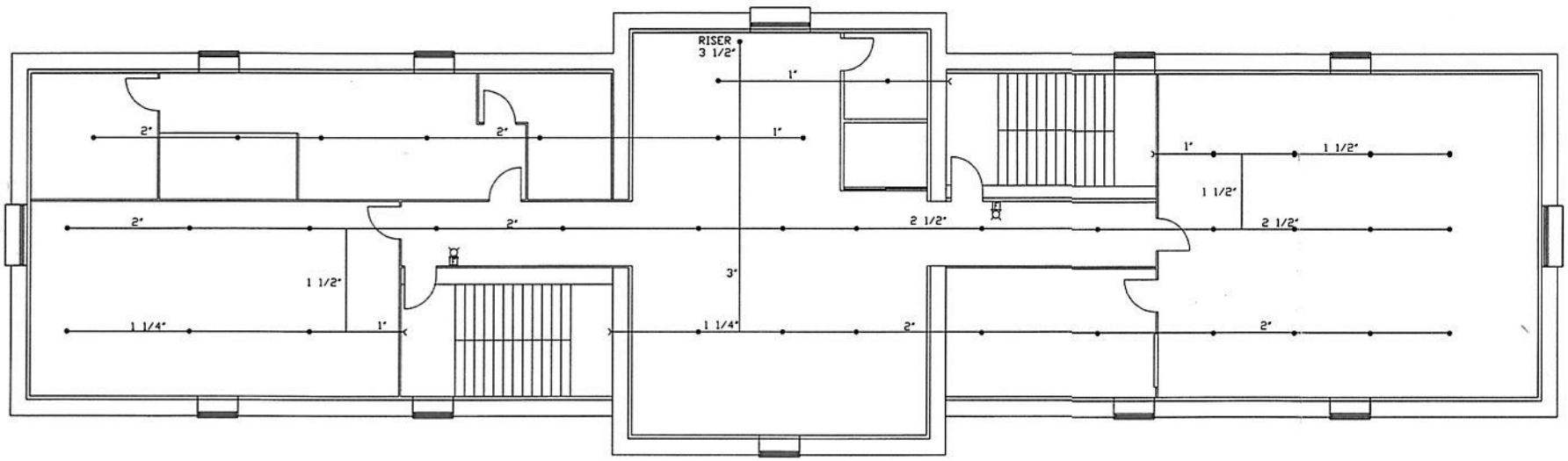
KARB Associates

Scale:
1/10" = 1'

26 MAY 2000

FIRST FLOOR
FIRE
PROTECTION

FP-1



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KARB Associates

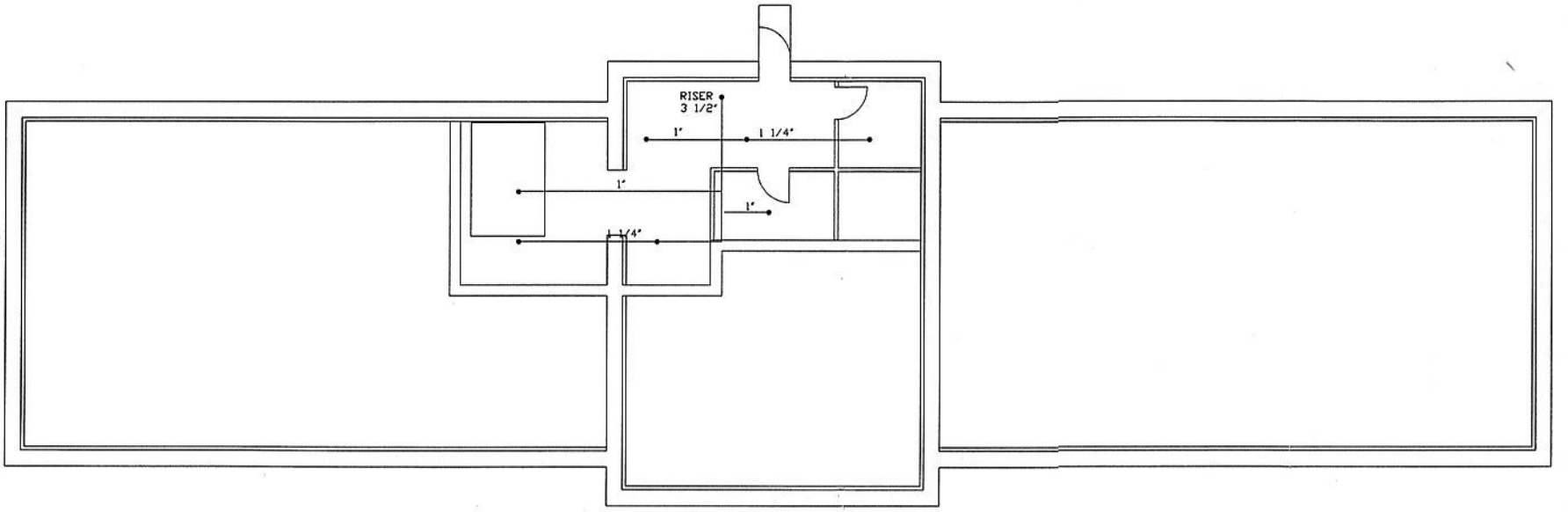
Scale:
1/10" = 1'

26 MAY 2000

SECOND FLOOR
FIRE
PROTECTION

FP-2

App III. 2. G. c



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KABB Associates

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
FIRE
PROTECTION

FP-3

Appendix III.H
Miscellaneous

Transformer Pad

Description

- Transformer is 32" x 20:
- Weight is 600 lbs

Requirements

- No special requirements by BOCA
- No footer required
- Stone base
- Concrete pad

Design

- 3500 psi Air Entrained concrete
- 42" x 32" x 6" – pad with eased edges
- 5" stone base
- # 5 rebar mat – 12" on center

Cost

- $300.00

Appendix III.I
Cost Estimate

Appendix III.I
Building Cost Estimate

Items		Cost
General Conditions		$200,000.00
Demolition		$225,000.00
Rough Carpentry		$300,000.00
Finish Carpentry		$125,000.00
Doors & Hardware		$20,000.00
Glass & Glazing		$25,000.00
Drywall		$75,000.00
Roofing		$100,000.00
Concrete		$125,000.00
Masonry		$30,000.00
Ceilings		$30,000.00
Flooring		$85,000.00
Painting		$15,000.00
Toilets Accessories		$1,000.00
Fire Protection		$20,000.00
Plumbing		$200,000.00
Mechanical		$250,000.00
Electrical		$175,000.00
SubTotal		$2,001,000.00
OverHead & Fee	5%	$100,050.00
Total Cost		**$2,101,050.00**

APPENDIX IV
Amphitheater

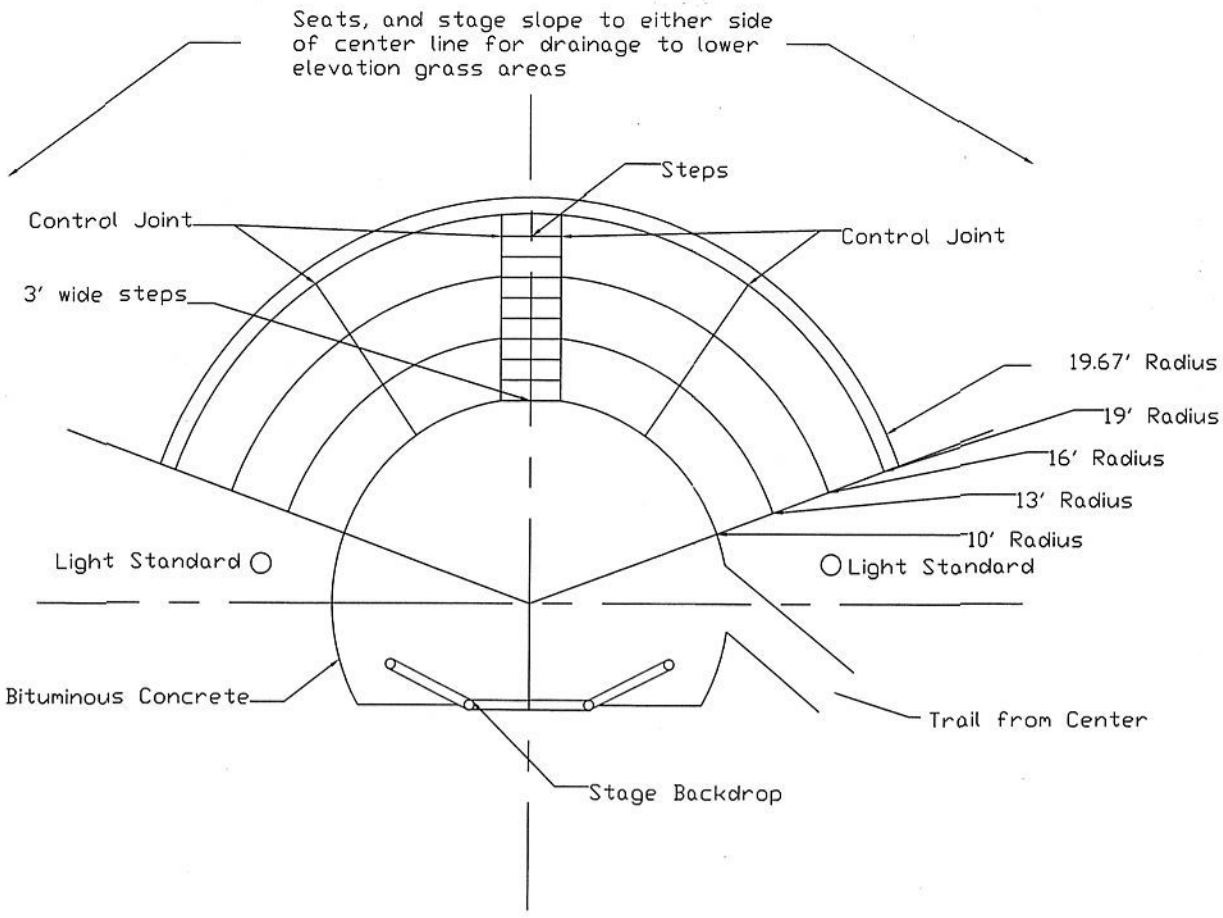
A. Calculations
B. Plans
    1. OA-1 Amphitheater
    2. OA-2 Amphitheater details
    3. OA-3 Amphitheater details
C. Estimate
D. Matrix

Appendix IV.A

Amphitheater Design

Loads

- Since the amphitheater will subject only to very small live loads, reinforcement design was very basic
- The amphitheater is basically a stepped exterior floor slab that will seat 50 people, and provide handicap access
- Steel reinforcement will consist of # 4 rebar mats, an # 4 vertical and horizontal rebar at vertical steps. Purpose of rebar is to prevent failure due to expansion, contraction, and shrinkage forces
- Concrete is 3500 psi, Air Entrained as requested by BOCA. The cements provide concrete with improved resistance to freeze thaw action
- Control joints will be used to control the cracking that will naturally occur in the concrete
- There will be a 4" stone base on top of the existing silty sand soil, and topped with 8" of 3500 psi Air Entrained concrete
- There will be 2' wide by 1.5' deep footers under each vertical portion of step in seating to prevent movement
- Access to all levels of the radial seating will be through a set of steps running up the middle of pad
- The steps will be poured in place with the slab, with a 12" run and 7.67" rise. This will break up each segment into 3 steps that will be comfortable for both children and adults
- The front path will serve as the main entrance to the amphitheater for all
- All side walks will be 4'wide, and consist of 3" of stone, and 2" of bituminous concrete



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

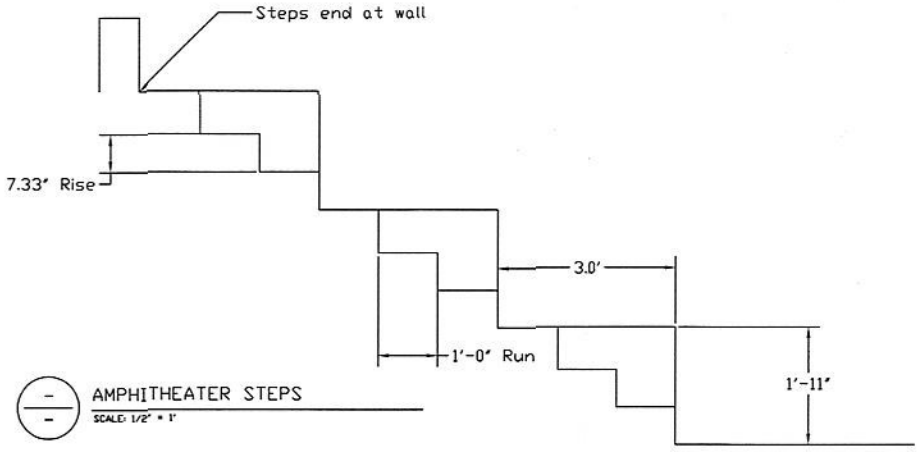
KABB Associates

Scale:
1' = 2'

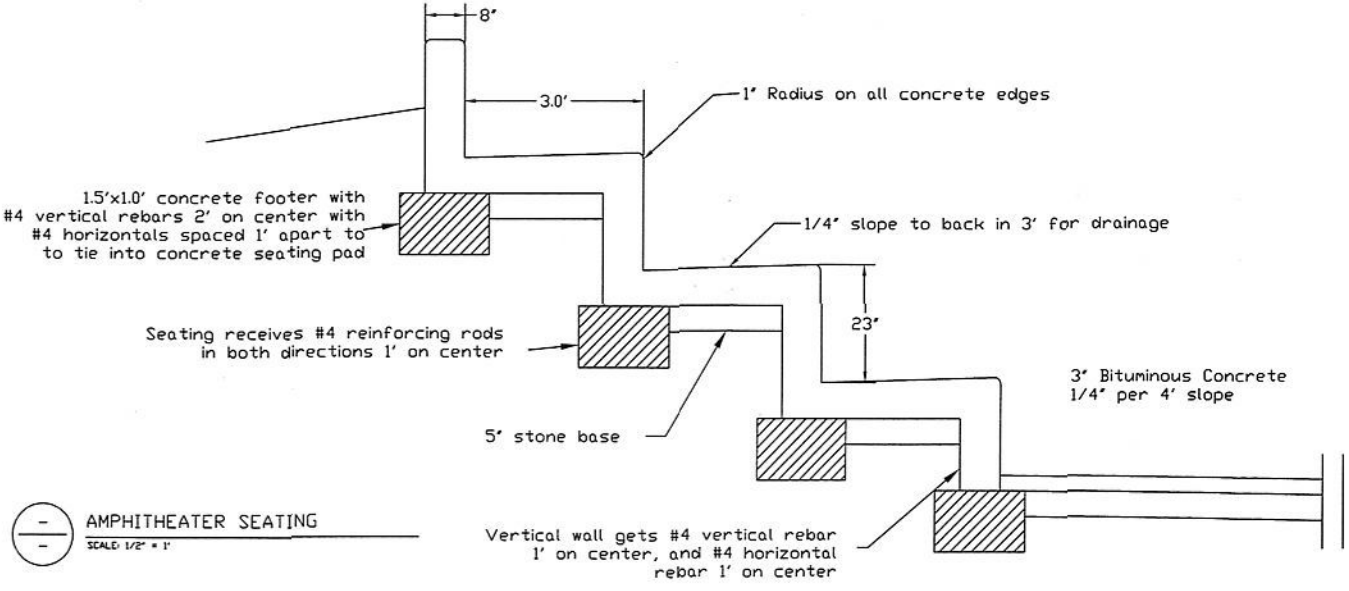
26 MAY 2000

AMPHITHEATER

DA-1



AMPHITHEATER STEPS
SCALE: 1/2" = 1'



AMPHITHEATER SEATING
SCALE: 1/2" = 1'

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

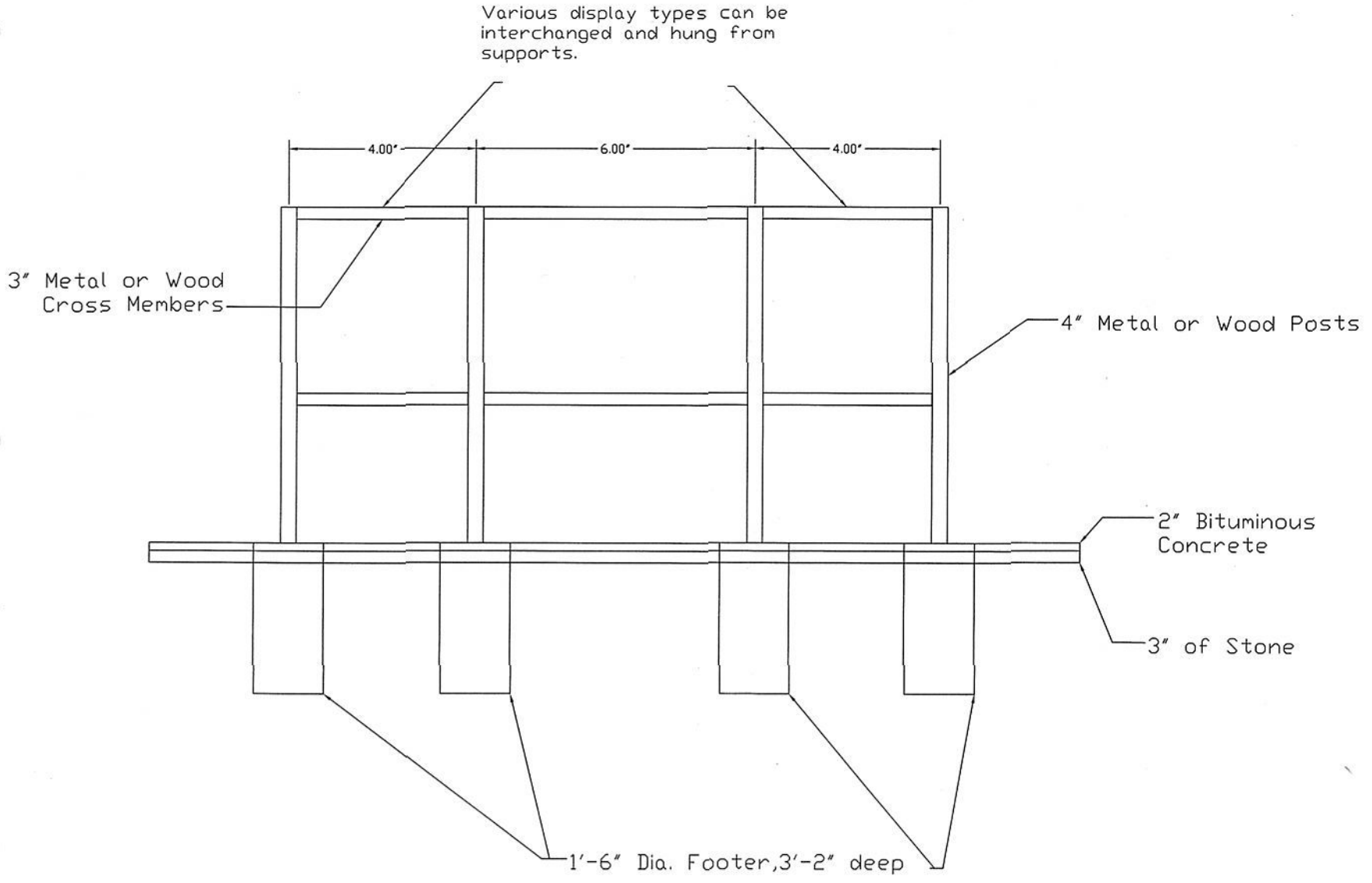
KWRB Associates

Scale:
SEE DWG.

26 MAY 2000

AMPHITHEATER DETAILS

DA-2



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KABR Associates

Scale: SEE DWG.

26 MAY 2000

AMPHITHEATER DETAILS

DA-3

Appendix IV.C

Amphitheater Cost Estimate

Type	Quantity	Cost/lf ($)	Total cost ($)
Concrete slab (cy)	18	$75.00	$1,350.00
Concrete footers (cy)	17	$75.00	$1,275.00
Bituminous Concrete (sy	90	$8.00	$720.00
Excavation/stone	NA	NA	$2,000.00
# 4 Rebar	64	$2.84	$181.76
Sealer	NA	NA	$200.00
Forms	NA	NA	$200.00
Stage backdrop	NA	NA	$2,500.00
Electrical	N/A	N/A	$3,000.00
		Total	**$11,426.76**

Union labor rates are being used

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
Laborer	Pour concrete	$38.00	48.0	$1,824.00
Concrete Finishers	Finish concrete	$45.00	48.0	$2,160.00
Carpenter	Formwork	$48.00	48.0	$2,304.00
Iron Worker	Steel work	$48.00	32.0	$1,536.00
			Total	**$7,824.00**

Total Cost of Amphitheater = **$19,250.76**

Amphitheater Decision Matrices

Seating Alternatives

1. Concrete wall with hardwood seats
2. Masonry Block with hardwood seats
3. Benches with pipe connections
4. Landcaping logs

		Alternatives			
Criterion	**Weight (%)**	**1**	**2**	**3**	**4**
Cost	30	6	7	9	10
Durability (flood)	30	10	9	7	5
Safety	25	10	9	8	5
Aesthetics	15	7	7	8	6
Totals	100	835	810	800	665

Concrete is selected alternative, however, aesthetics will need to be improved possibly by patterning the concrete.

Ground Surface Alternatives

1. Concrete
2. Bituminous concrete
3. Brick pavers
4. Stone base with top screenings

		Alternatives			
Criterion	**Weight (%)**	**1**	**2**	**3**	**4**
Cost	**30**	5	8	7	10
Durability (flood)	**30**	10	8	6	3
Clean factor	**15**	10	10	8	5
Aesthetics	**25**	8	8	10	7
Totals	**100**	**820**	**850**	**740**	**620**

Bituminous Concrete is selected alternative

APPENDIX V
Pavilion

A. Calculations
B. Plans
    1. OP-1 Pavilion side view
    2. OP-2 Pavilion top view
    3. OP-3 Pavilion front view
C. Estimate
D. Matrix

Appendix V.A

Pavilion Calculations

Roof Area = 720 sf

Weight of Roof

- Shingles = 2.5 psf * 720 sf = 1800 lbs
- Plywood = 1.5 psf * 720 = 1080 lbs
- Miscellaneous = 200 lbs
- Snow load = Pf = Ce*I*Pg = 0.9*1*25 =22.5 psf for geographic location
- Total load = 27 psf
- Wind load is included in prefabricated truss design

Boca Requirements

- For a building of this type, and for its specific use, the pre-fabricated trusses must be designed to support 27 psf.
- This includes all related dead and live loads for the specific geographic location
- With this in mind, pre-fabricated trusses were selected to handle a 30 psf live, dead, snow, and wind loads
- The trusses have a 22 ft span, and will be set 2 ft on center

Beam Load

- Structural members – 6"x 6" pre-treated southern pine
- Beam with compression perpendicular to grain -345 psi
- Loads to be distributed on beam by trusses as point loads
- Deflection

$\delta = 5WL^3/384EI$ E=1,800,000 psi I= 76.3 in^4

Using L/360 as the allowable deflection

$\delta = [5*1067 \text{ lbs} * (10' 12")^3]/(384 * 1{,}800{,}000 \text{ psi} * 76.3 \text{ in}^4) = 0.174$ inches

L/360 = (10' * 12")/360 = 0.333 inches

6" x 6" southern pine beams are more than adequate to support critical load

Beams

- Structural members – 6"x 6" pre-treated southern pine
- Beam bearing stress parallel to grain – 1350 psi
- Maximum load on most critical column – 3,240 lbs
- Maximum length of Column – 8'
- Beam is more then adequate to support loads

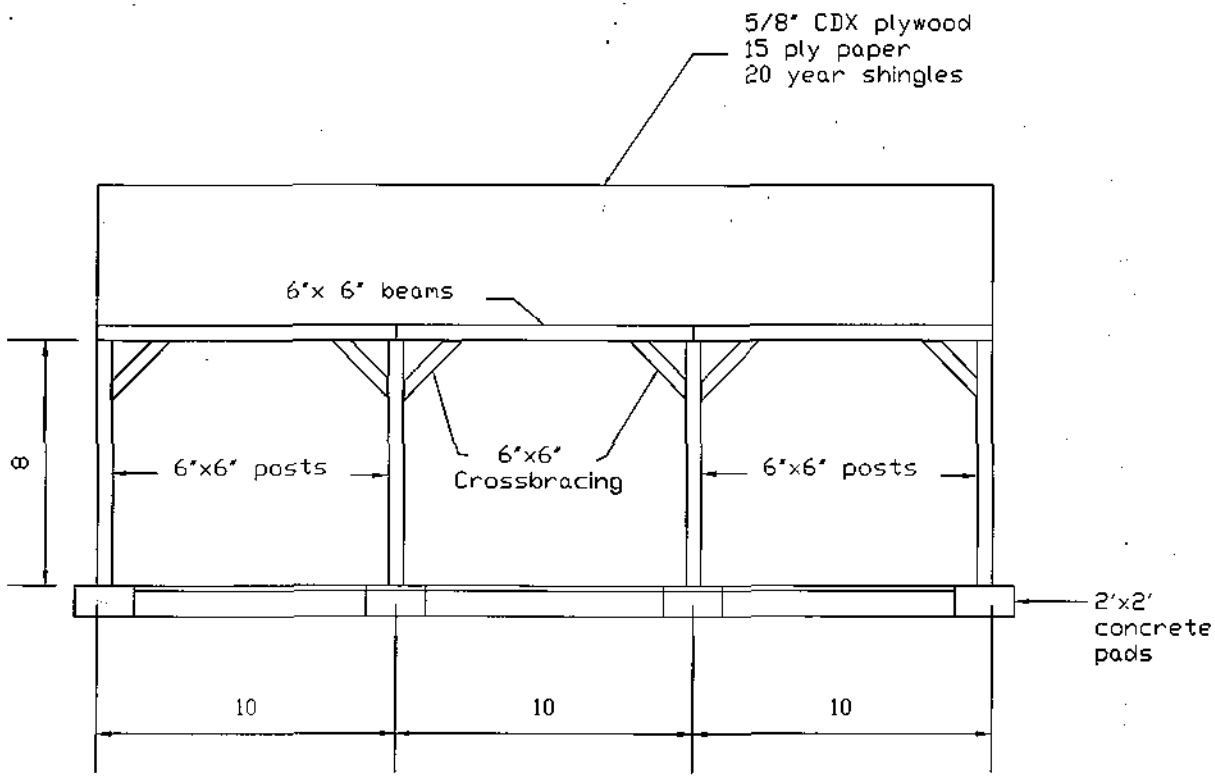
Angle Brackets

- Double angle iron brackets will be fastened to the base of each column and anchored to the column pads using ¼ " anchor masonry tapping screws
- The angle iron brackets will be used to resist any horizontal loads

Concrete pads

- Pad will be 18" in diameter, and 38" deep to meet frost line requirements

App I.B.1



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

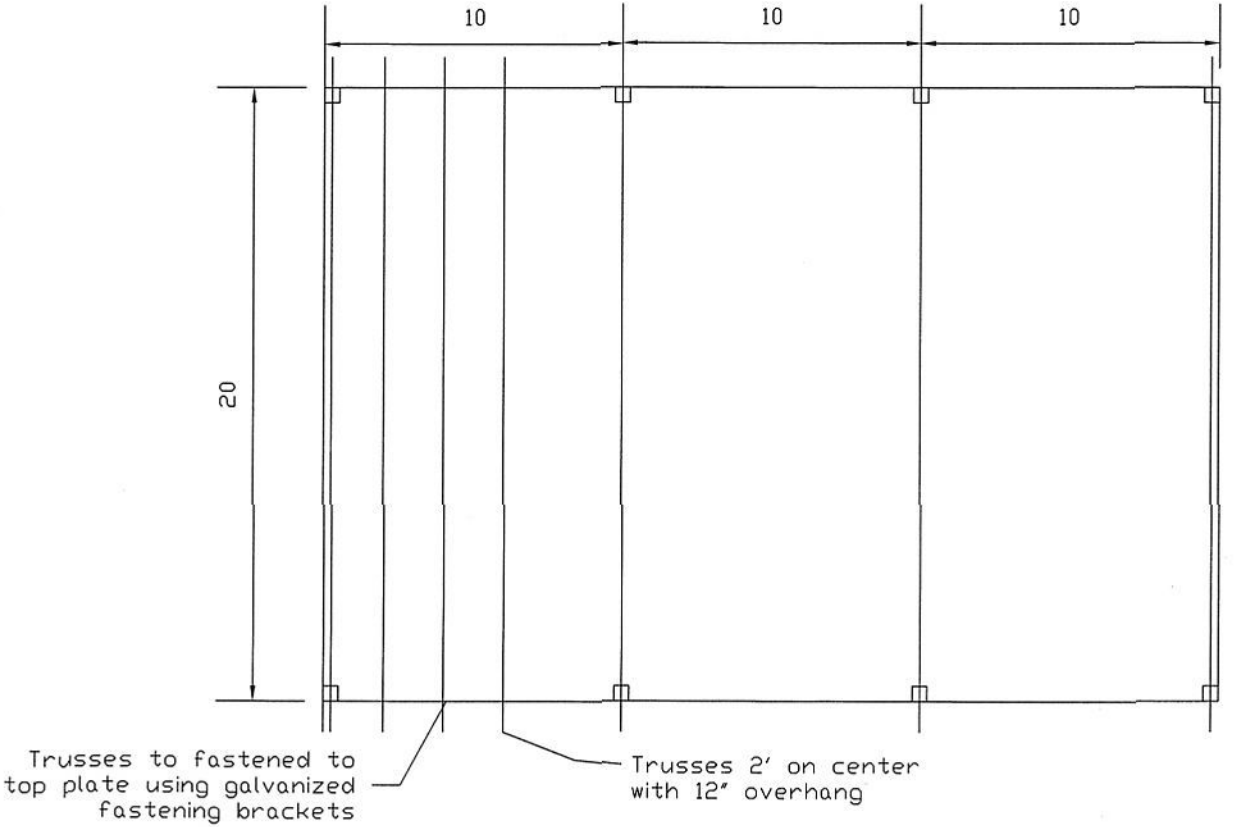
Associates

Scale:
1/4" = 1'

26 MAY 2000

PAVILION
SIDE VIEW

OP-1



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

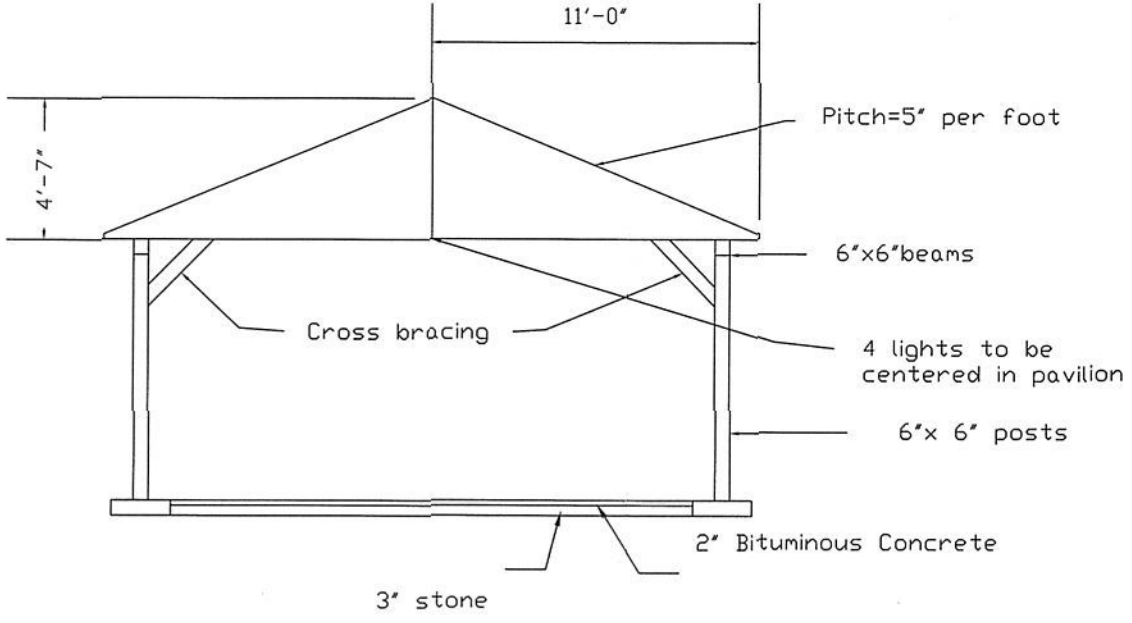
KARB Associates

Scale:
1/4" = 1'

26 MAY 2000

PAVILION
TOP VIEW

OP-2



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KABD Associates

Scale:
1/4" = 1'

26 MAY 2000

PAVILION
FRONT VIEW

DP-3

Appendix V.C

Pavilion Estimate

All lumber is pre-treated and southern pine

Type	Quantity (lf) (cy)	Cost/lf ($)	Total cost ($)
2"x 4" trusses	30	$75.00	$2,250.00
6" x 6" plates	64	$2.84	$181.76
6" x 6" columns	64	$2.84	$181.76
6" x 6" bracing	40	$2.84	$113.60
2" x 6"	40	$0.93	$37.20
5/8" Plywood	25	$23.79	$594.75
1"x 2" trim	N/A	N/A	$40.00
Shingles	8	$26.00	$208.00
Electrical	N/A	N/A	$3,000.00
Angle iron	N/A	N/A	$30.00
T-111	6	$27.79	$166.74
Concrete	8	$90.00	$720.00
Stone floor	N/A	N/A	$200.00
Hardware			$25.00
Equipment Rental			$28.00
		Total	$7,776.81

Union labor rates are being used

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
laborer	Pads	$38.00	16.0	$608.00
laborer	Poor Concrete	$38.00	8.0	$304.00
laborer	Material/cleanup	$38.00	32.0	$1,216.00
Carpenter	Layout	$48.00	5.0	$240.00
Carpenter	Framing	$48.00	48.0	$2,304.00
Carpenter	Roofing	$48.00	48.0	$2,304.00
			Total	$6,976.00

Total Cost of Pavilion = **$14,752.81**

Pavilion

Structure

1. Wood Post and Beam installed Excellent =10
2. Gazebo Installed Poor = 0
3. Wood Post Material only-construction by community

		Alternative		
Criterion	**Weight (%)**	**1**	**2**	**3**
Total Cost	**30**	8	7	10
Durability	**25**	9	7	8
Aesthetics	**20**	8	9	8
Handicap friendly	**25**	10	7	10
Total	**100**	**875**	**740**	**910**

Wood Post and beam is selected alternative

APPENDIX VI
Environmental Trail

A. Calculations
B. Plans OT-1 Environmental trail detail
C. Estimate
D. Matrix

Environmental Trail Calculations

Deflection

Analysis of 2" x 8" supports running from post to post.

Total dead load = 253 lbs. Per 8 ft. section
Total live Load will consider 8 people each weighing 180 lbs will be standing in the 8 ft. section to be considered.
Total live load = 1600 lbs.

Breaking the total weight down to a per beam load
Total dead load per beam = 127 lbs Total live load per beam = 800 lbs

Using safety factors of 1.7 for the live load, and 1.4 for the dead load we come up with a total load of 1720 lbs. We will consider this load as a point load at the center of the 8' section just as a additional safety factor.

For maximum deflection of the pre-treated lumber which is Southern Pine.

Delta =5wl^3/(384EI) E = 1,800,000 psi I = 47.64 in^4

Delta = [5 * 1720 lbs * (8' * 12")]/[384 *(1,800,000 psi * 47.635 in^4)] = **0.231" = roughly ¼ "**

Using L/360 as an allowable deflection. Delta = 96"/360 = **0.267"**

0.231"<0.267

The 2" x 8" pretreated boards are acceptable according to BOCA codes.

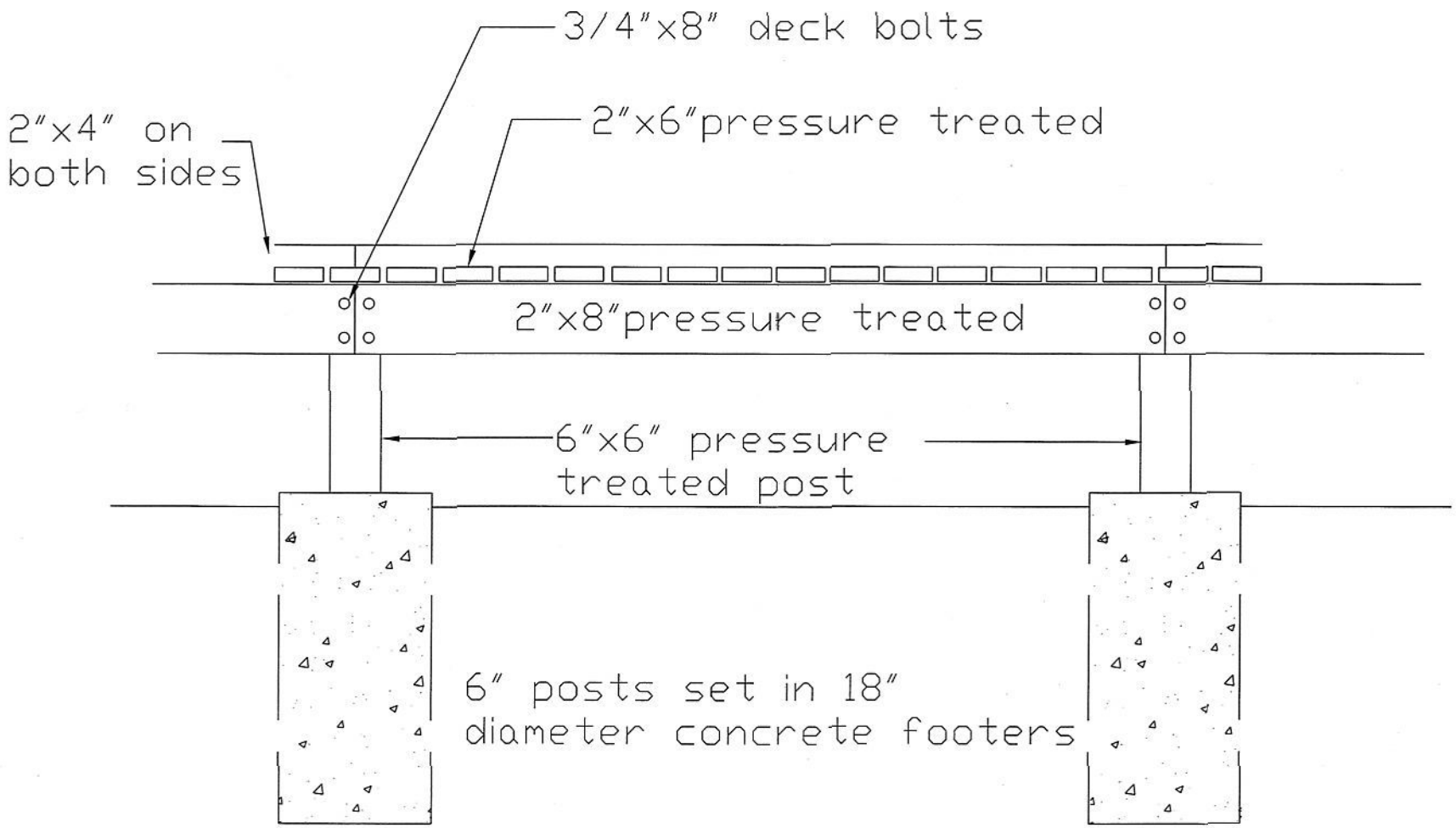
Post Stability

The posts being used will also be Pretreated Southern Pine.
The posts will be 6" x 6" with no post exceeding a length of 3' above the footer.
Considering the strength of a 6" x 6" member, and the lengths, which will be used in the deck, there are no problems with instability due to slenderness or strength.

Bolts

Using the 1720 lbs. Per beam, and considering two bolts at each end of the beam, each bolt will need to resist a shear load of 430#.

App VI. B



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

KABB Associates

Scale: 1" = 1'

26 MAY 2000

TRAIL DETAILS

DT-1

Appendix VI.C

Environmental Trail Estimate

Materials are being considered for 300 feet of trail using pretreated Southern Pine

Estimate will be taken from an 8' section of trail and then calculated for entire length

Type	Quantity (lf)	Cost/lf ($)	Total cost ($)
2" x 8"	16	$1.03	$16.48
6" x 6"	10	$2.84	$28.40
2" x 6"	90	$0.93	$83.70
2" x 4"	24	$0.65	$15.60
Hardware			$25.00
Equipment Rental			$28.00
		Total	$197.18
	Cost per lineal foot of trail		**$24.65**

Estimate of Labor per 8' section of trail Union labor rates are being used

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
laborer	Auger holes	$38.00	1.0	$38.00
laborer	Poor Concrete	$38.00	1.0	$38.00
laborer	Material/cleanup	$38.00	0.5	$19.00
Carpenter	Layout	$48.00	0.5	$24.00
Carpenter	Set posts & brace	$48.00	1.0	$48.00
Carpenter	Frame & deck	$48.00	3.0	$144.00
			Total	$311.00
		Cost per lineal foot of trail		**$38.88**

Total Cost of Deck = ($24.65 + $38.88) * 300 = **$19,056.75**

Environmental Trail

Material

1. Concrete
2. Bituminous Concrete
3. Geo-Composites with Stone and Screening
4. Pressure Treated lumber

Excellent =10
Poor = 0

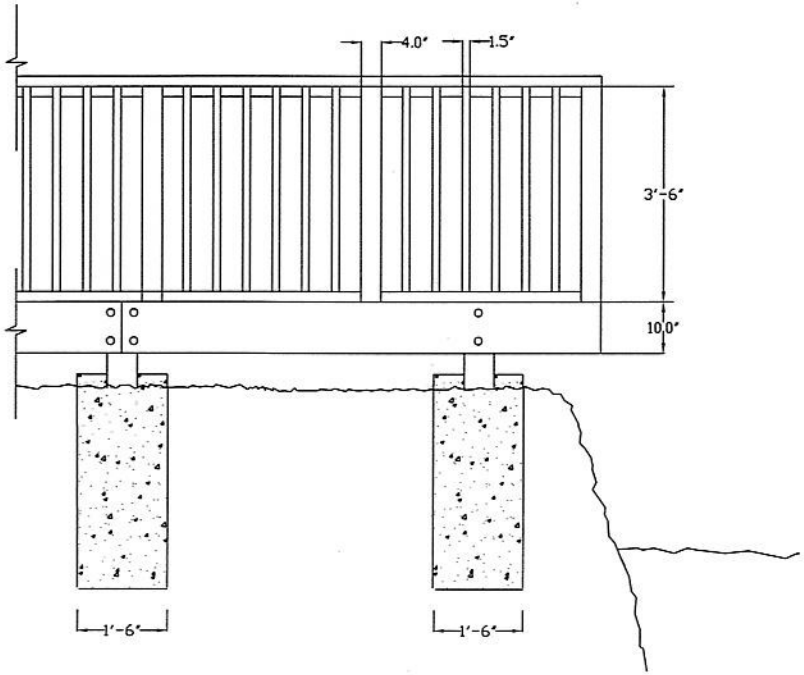
		Alternatives			
Criterion	**Weight (%)**	**1**	**2**	**3**	**4**
Total Cost	**25**	5	7	7	5
Durability	**20**	10	8	6	9
Handicap Friendly	**15**	10	10	7	9
Environment Friendly	**20**	5	5	9	9
Owners choice	**20**	3	7	3	10
Total	**100**	**635**	**725**	**640**	**820**

Pressure treated lumber selected alternative

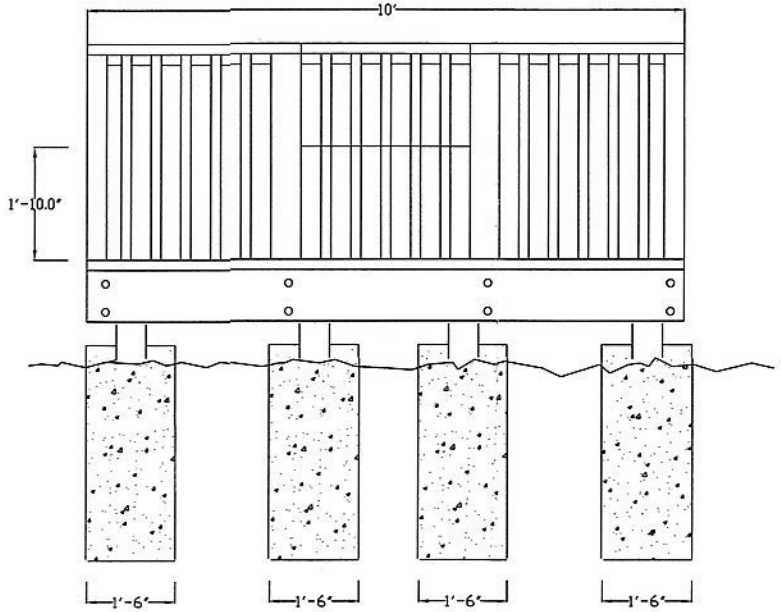
APPENDIX VII
Observation Deck

A. Plans
   1. OR-1 Observation deck details
   2. OR-2 Observation deck details

B. Estimate



OBSERVATION DECK - SIDE VIEW
SCALE: 1/2" = 1'



OBSERVATION DECK - FRONT VIEW
SCALE: 1/2" = 1'

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

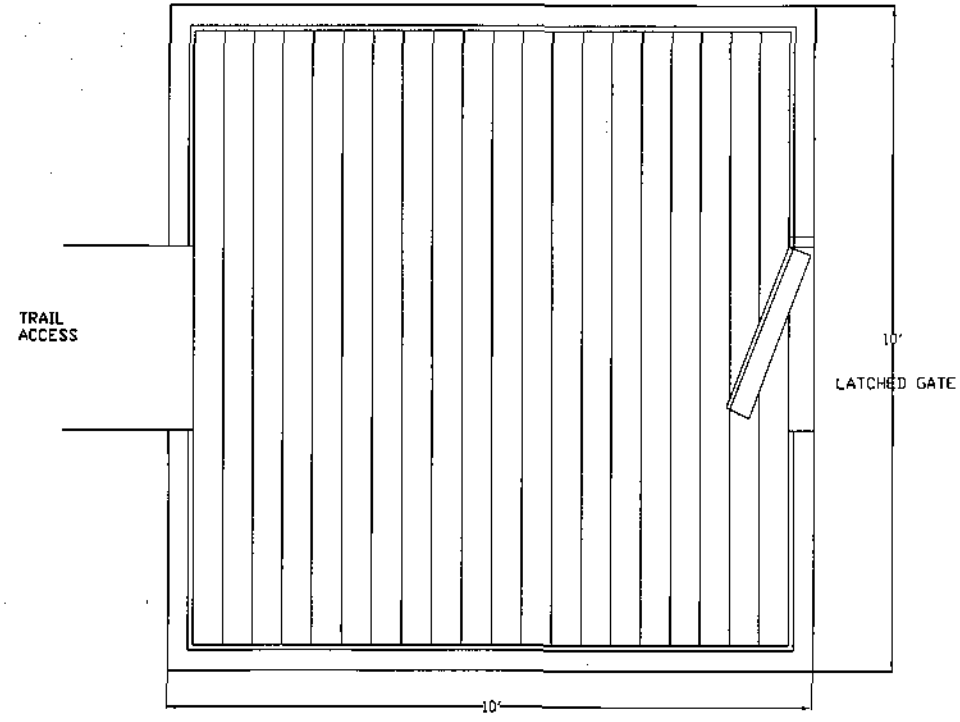
KABR Associates

Scale: SEE DWG.

26 MAY 2000

OBSERVATION DECK

OR-1



OBSERVATION DECK - TOP VIEW
SCALE: 1/2" = 1'

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
SEE DWG.

26 MAY 2000

OBSERVATION
DECK

OR-2

Appendix VII.B

Observation Deck Estimate

Materials are being considered for 10 x 10 feet deck using pretreated Southern Pine

Type	Quantity (lf)	Cost/lf ($)	Total cost ($)
2" x 8"	60	$1.03	$61.80
6" x 6"	40	$2.84	$113.60
2" x 6"	200	$0.93	$186.00
2" x 4"	70	$0.65	$45.50
4" x 4"	49	$1.05	$51.45
1" x 4"	40	$0.70	$28.00
1" x 1.5"	231	$0.75	$173.25
Hardware			$150.00
Equipment Rental			$28.00
		Total	$837.60

Union labor rates are being used

Auger holes and concrete pour will be completed in conjunction with environmental trail.

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
laborer	Material/cleanup	$38.00	16.0	$608.00
Carpenter	Layout	$48.00	1.0	$48.00
Carpenter	Frame & deck	$48.00	15.0	$720.00
			Total	$1,376.00

Total Cost of Deck = ($837.60 + $1376.00) = **$2,213.60**

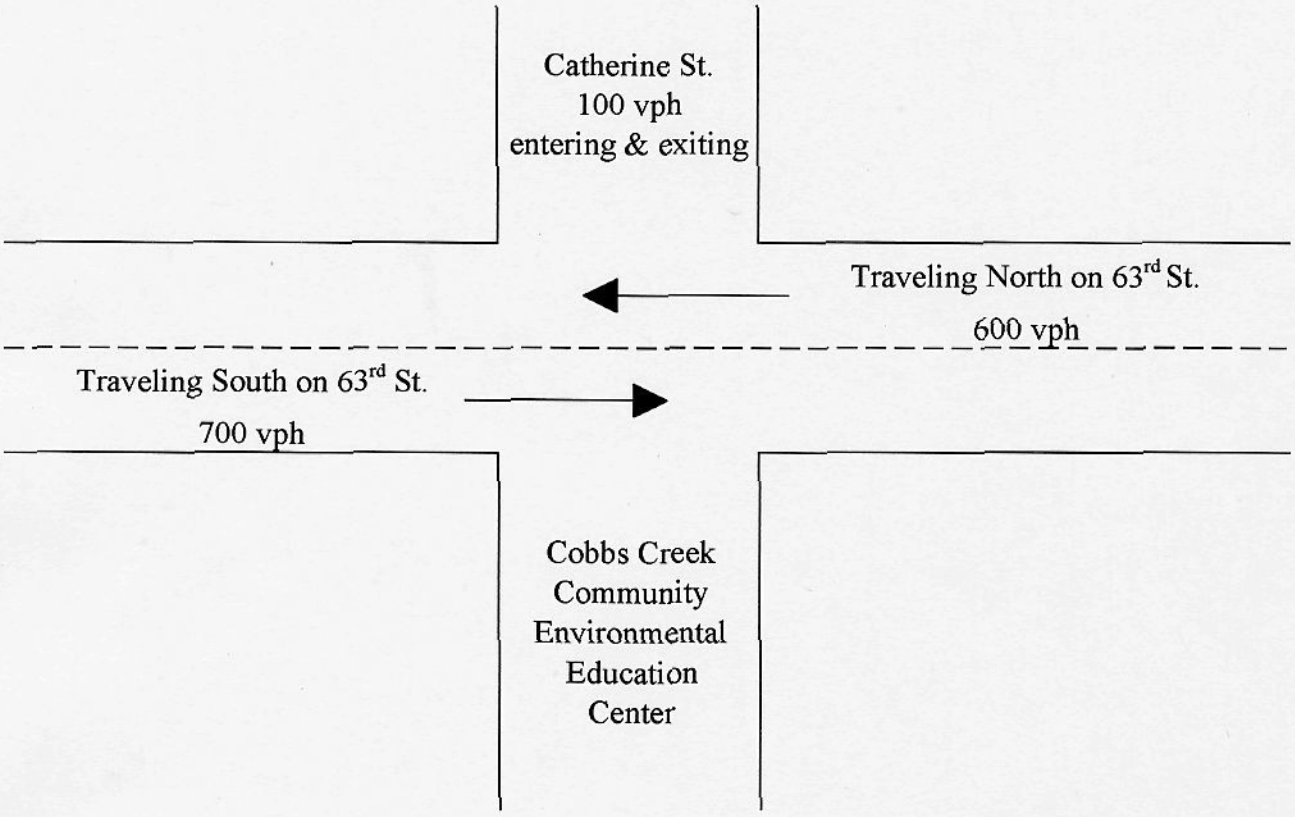
APPENDIX VIII
Parking & Traffic

A. Analysis
B. Estimate

Appendix VIII.A
Analysis

Traffic Analysis

The traffic analysis was completed between 7-8am and 4:30-5:30pm.
These times were used for peak traffic flow of the intersection.



The traffic signal to the north at Cedar Ave. limits approximately 15 vehicles per cycle allowing for a lull for drivers entering and existing the facility. Christian St. to the south allows approximately 12 vehicles per cycle. The traffic analysis concludes the minimum traffic added from the Cobbs Creek Community Environmental Education Center will not require additional alterations to the intersection of 63rd St. and Catherine St.

Appendix VIII.B

Parking Estimate

Materials are being considered for 5,400 sq. ft. of existing pavement and 8,000 sq. ft. new.

Existing Pavement:

Type	Quantity (sq. yd.)	Cost/sq. yd.($)	Total cost ($)
2" FA-BC Surface Course	600	$3.58	$2,148.00
		Total	$2,148.00

New Pavement:

Type	Quantity (sq. yd.)	Cost/sq. yd.($)	Total cost ($)
4" Aggregate	891	$4.55	$4,054.05
4" Bit. Stab. Base Course	891	$6.76	$6,023.16
2" FA-BC Surface Course	891	$3.58	$3,189.78
		Total	$13,266.99

Concrete Curbing:

Type	Quantity (lf.)	Cost/lf.($)	Total cost ($)
Curb & Gutter	300	$14.30	$4,290.00
		Total	$4,290.00

Equipment	Quantity	Rate ($)	Time (daily)	Total cost ($)
Asphalt Paver	1	$1,309.00	4	$5,236.00
Rollers, Steel Wheel	1	$224.00	4	$896.00
			Total	$6,132.00

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
Labor Foreman	Supervisor	$38.15	24.0	$915.60
3 Labors	Layout	$35.00	24.0	$2,520.00
2 Equip. Oper.	Applying	$43.80	24.0	$2,102.40
			Total	$5,538.00

Total Cost of Deck = ($837.60 + $1376.00) = **$31,374.99**

APPENDIX IX
Drainage

A. Rainfall data
B. StormCad calculations
C. Estimate

2.10.26

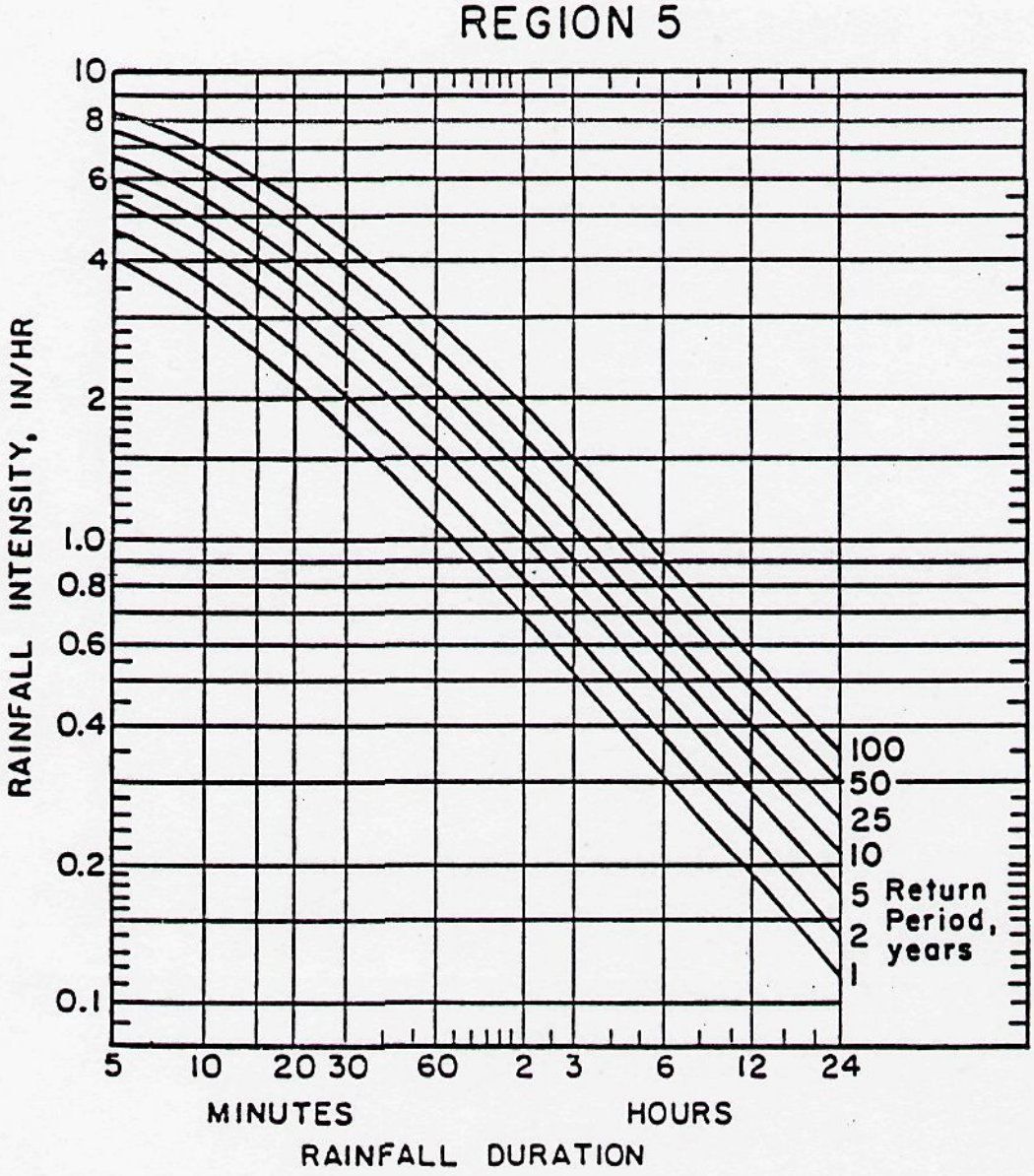


FIGURE 2.10.4.2(E)
STORM INTENSITY - DURATION - FREQUENCY CURVES FOR REGION 5

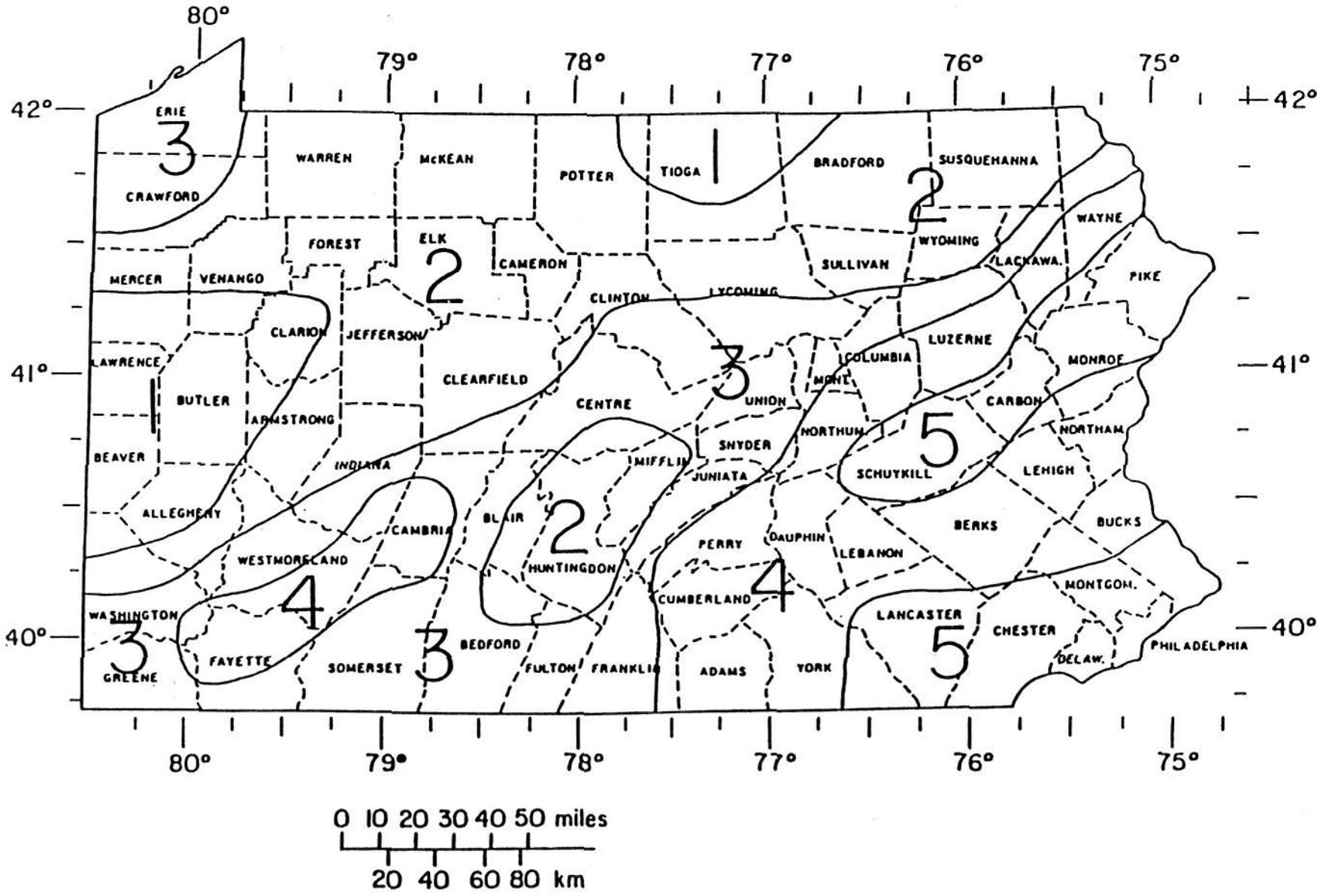
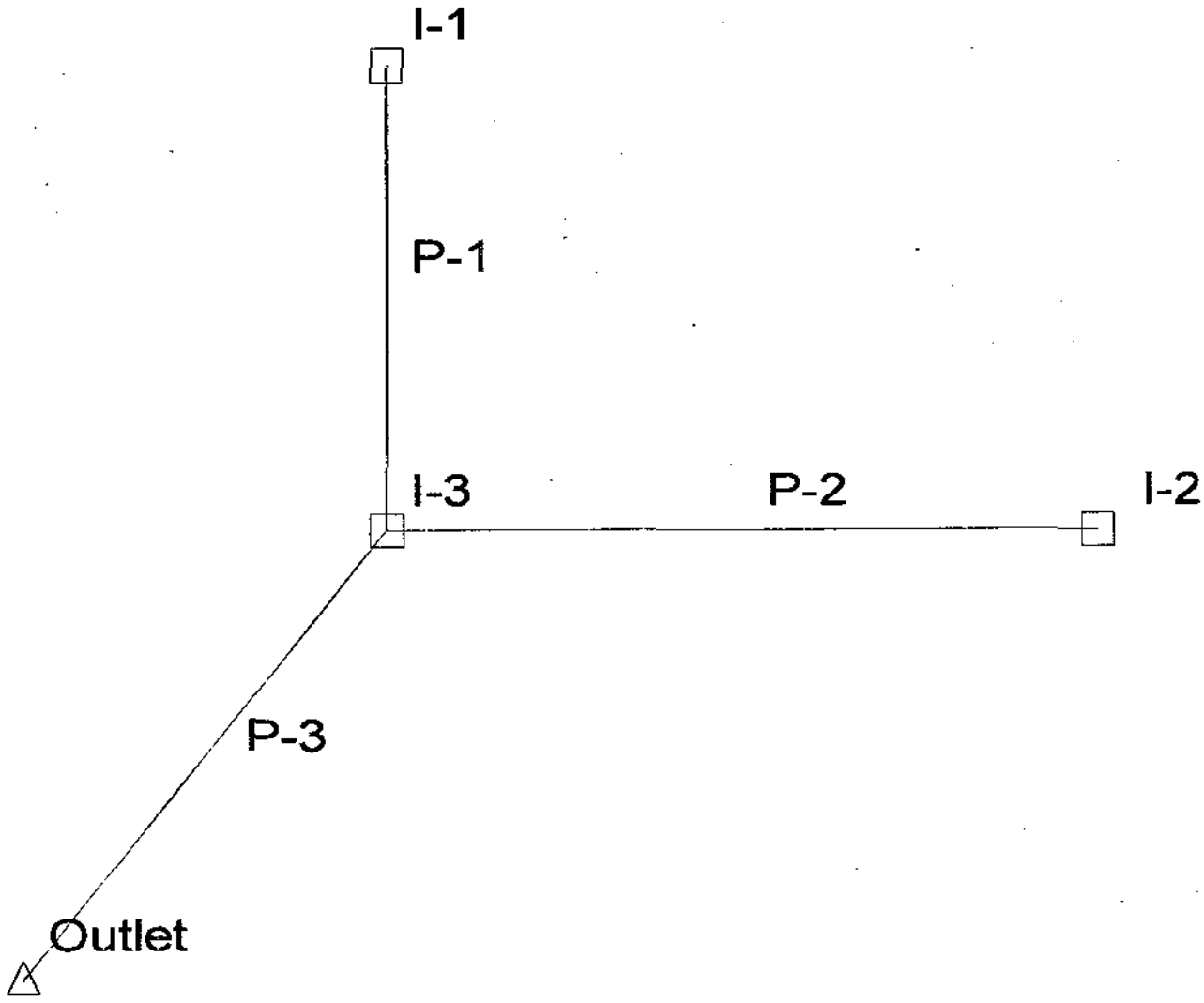


FIGURE 2.10.4.1
DELINEATED REGIONS WITH
UNIFORM INTENSITY

APP. A,

2.10.21



App. IX. B

DOT Report

Pipe	-Node- Upstream Downstream	Inlet Area (acres)	Inlet CA (acres)	Total CA (acres)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	-Section- Shape Size	Length (ft)	Average Velocity (ft/s)	Description
P-1	I-1	0.44	0.25	0.25	61.80	58.35	0.021212	1.68	Circular	70.00	3.01	
	I-3				60.10	57.01	0.024286	5.55	12 inch			
P-2	I-2	0.21	0.19	0.19	61.20	57.68	0.009001	1.30	Circular	90.00	2.60	
	I-3				60.10	57.01	0.012222	3.94	12 inch			
P-3	I-3	0.61	0.31	0.74	60.10	57.01	0.036827	4.91	Circular	250.00	8.10	
	Outlet				50.40	47.02	0.038600	7.02	12 inch			

App IX.B

App IX.B

---------- Beginning Calculation Cycle ----------
Discharge: 1.68 cfs at node I-1
Discharge: 1.30 cfs at node I-2
Discharge: 4.91 cfs at node I-3
Discharge: 4.81 cfs at node Outlet
Beginning iteration 1
Discharge: 1.68 cfs at node I-1
Discharge: 1.30 cfs at node I-2
Discharge: 4.91 cfs at node I-3
Discharge: 4.81 cfs at node Outlet
Discharge Convergence Achieved in 1 iterations: relative error: 0.0
---------- Calculations Complete ----------

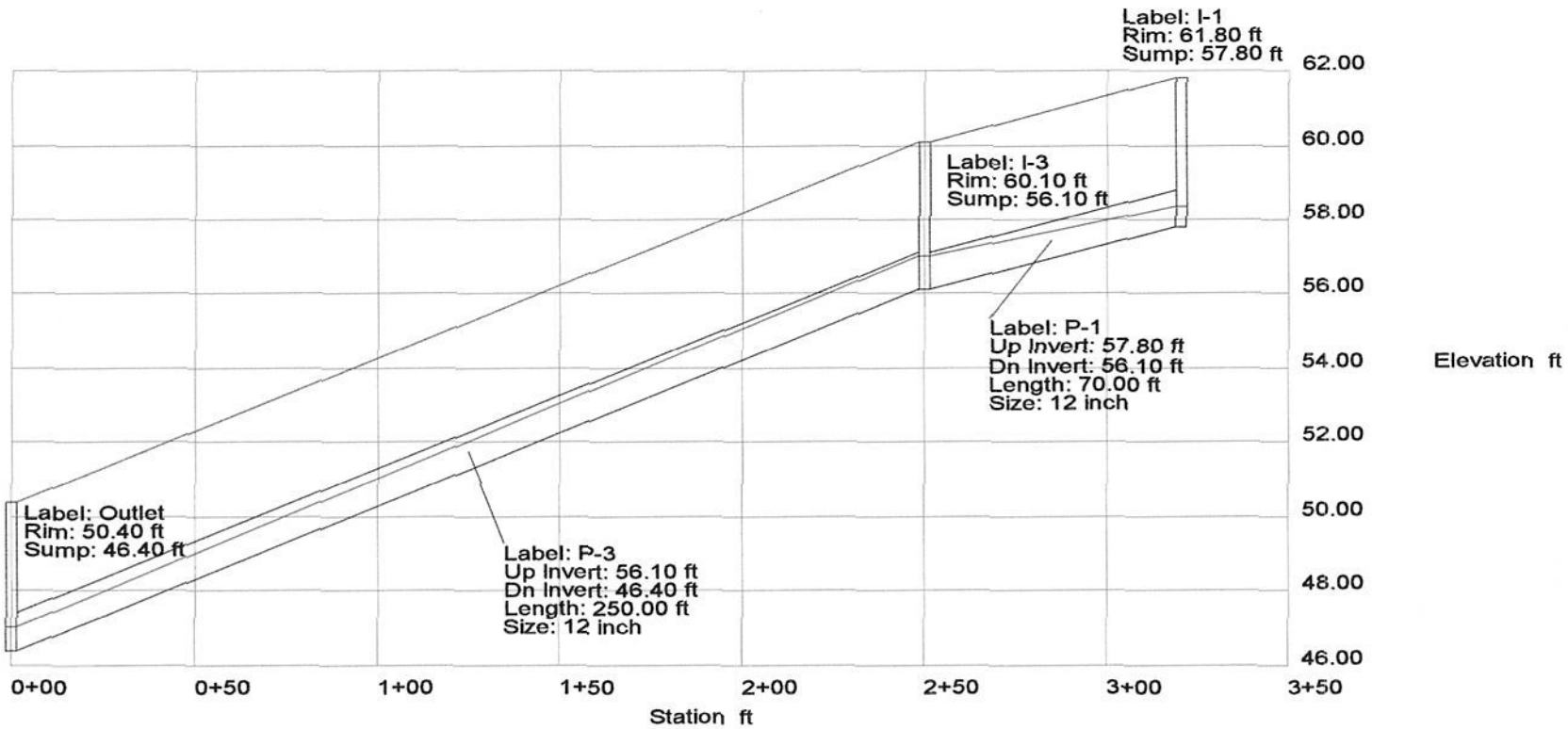
** Analysis Options **
Friction method: Manning's Formula
Hydraulic Grade Convergence Test: 0.001000
Maximum Network Traversals: 5
Number of Flow Profile Steps: 5
Discharge Convergence Test: 0.001000
Maximum Design Passes: 3

---------- Network Quick View ----------

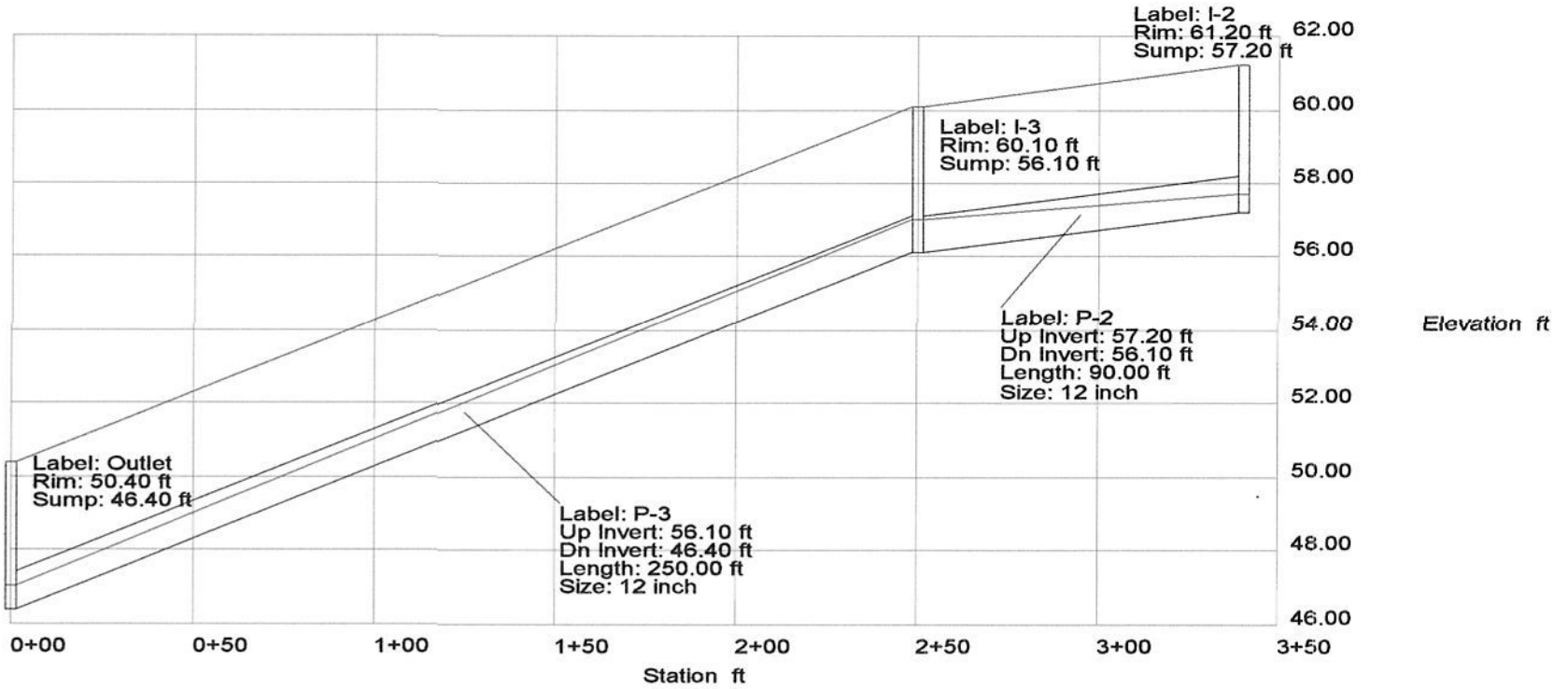
				Hydraulic Grade	
Label	Length	Size	Discharge	Upstream	Downstream
P-1	70.00	12 inch	1.68	58.35	57.01
P-3	250.00	12 inch	4.91	57.01	47.02
P-2	90.00	12 inch	1.30	57.68	57.01

		Elevations		
Label	Discharge	Ground	Upstream HGL	Downstream HGL
I-1	1.68	61.80	58.35	58.35
I-3	4.91	60.10	57.01	57.01
I-2	1.30	61.20	57.68	57.68
Outlet	4.81	50.40	47.02	47.02

Elapsed: 0 minute(s) 3 second(s)


Label: I-1
Rim: 61.80 ft
Sump: 57.80 ft
Label: I-3
Rim: 60.10 ft
Sump: 56.10 ft
Label: P-1
Up Invert: 57.80 ft
Dn Invert: 56.10 ft
Length: 70.00 ft
Size: 12 inch
Label: Outlet
Rim: 50.40 ft
Sump: 46.40 ft
Label: P-3
Up Invert: 56.10 ft
Dn Invert: 46.40 ft
Length: 250.00 ft
Size: 12 inch
62.00
60.00
58.00
56.00
54.00
52.00
50.00
48.00
46.00
Elevation ft
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station ft

App. IX, 19


Label: I-2
Rim: 61.20 ft
Sump: 57.20 ft
Label: I-3
Rim: 60.10 ft
Sump: 56.10 ft
Label: P-2
Up Invert: 57.20 ft
Dn Invert: 56.10 ft
Length: 90.00 ft
Size: 12 inch
Label: Outlet
Rim: 50.40 ft
Sump: 46.40 ft
Label: P-3
Up Invert: 56.10 ft
Dn Invert: 46.40 ft
Length: 250.00 ft
Size: 12 inch
62.00
60.00
58.00
56.00
54.00
52.00
50.00
48.00
46.00
Elevation ft
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
Station ft

App. D, B

Appendix IX.C

Drainage (Storm Sewer) Estimate

Materials are being considered for drainage of 13,400 sq. ft. of impervious area.

Drainage (Storm Sewer) Inlets:

Type	Quantity (ea.)	Cost/ea.($)	Total cost ($)
Inlet Type "B" (0-8' DP.)	3	$1,300.00	$3,900.00
		Total	$3,900.00

Drainage (Storm Sewer) Pipe:

Type	Quantity (lf.)	Cost/lf.($)	Total cost ($)
12" R.C.P., Cl. III T&G	410	$16.90	$6,929.00
		Total	$6,929.00

Equipment	Quantity	Rate ($)	Time (daily)	Total Cost ($)
Backhoe	1	$203.00	2	$406.00
			Total	$406.00

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
Labor Foreman	Material/cleanup	$38.15	24.0	$915.60
3 Labors	Layout	$35.00	24.0	$2,520.00
Equip. Oper.	Frame & deck	$42.00	24.0	$1,008.00
			Total	$4,443.60

Total Cost of Drainage = **$15,678.60**

APPENDIX X

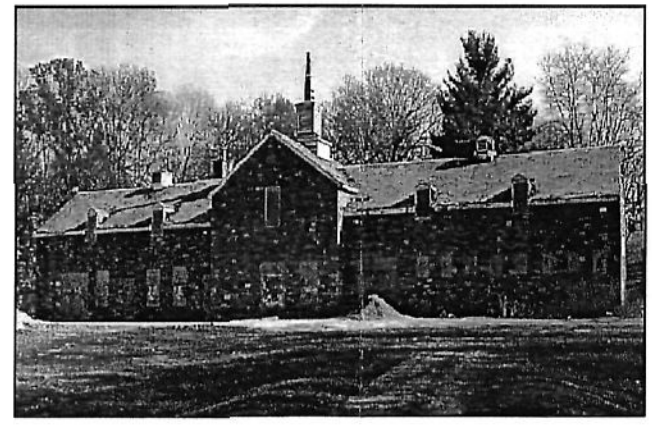
Plans

COBBS CREEK COMMUNITY ENVIRONMENTAL EDUCATION CENTER

63RD AND CATHERINE STREETS
PHILADELPHIA, PA

A-0	TITLE SHEET
S-1	SITE PLAN
A-1	FIRST FLOOR ARCHITECTURAL
A-2	SECOND FLOOR ARCHITECTURAL
A-3	BASEMENT ARCHITECTURAL
E-1	FIRST FLOOR ELECTRICAL
E-2	SECOND FLOOR ELECTRICAL
E-3	BASEMENT ELECTRICAL
E-4	ELECTRICAL LINE DIAGRAM
FP-1	FIRST FLOOR FIRE PROTECTION
FP-2	SECOND FLOOR FIRE PROTECTION
FP-3	BASEMENT FIRE PROTECTION
L-1	FIRST FLOOR LIGHTING
L-2	SECOND FLOOR LIGHTING
L-3	BASEMENT LIGHTING
M-1	FIRST FLOOR MECHANICAL
M-2	SECOND FLOOR MECHANICAL
M-3	BASEMENT MECHANICAL
M-4	MECHANICAL LINE DIAGRAM

P-1	FIRST FLOOR PLUMBING
P-2	SECOND FLOOR PLUMBING
P-3	BASEMENT PLUMBING
P-4	PLUMBING LINE DIAGRAM
U-1	UTILITIES SITE PLAN
OA-1	AMPHITHEATER TOP VIEW
OA-2	AMPHITHEATER DETAILS
OA-3	AMPHITHEATER DETAILS
OP-1	PAVILION SIDE VIEW
OP-2	PAVILION TOP VIEW
OP-3	PAVILION FRONT VIEW
OT-1	TRAIL
OR-1	OBSERVATION DECK
OR-2	OBSERVATION DECK



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

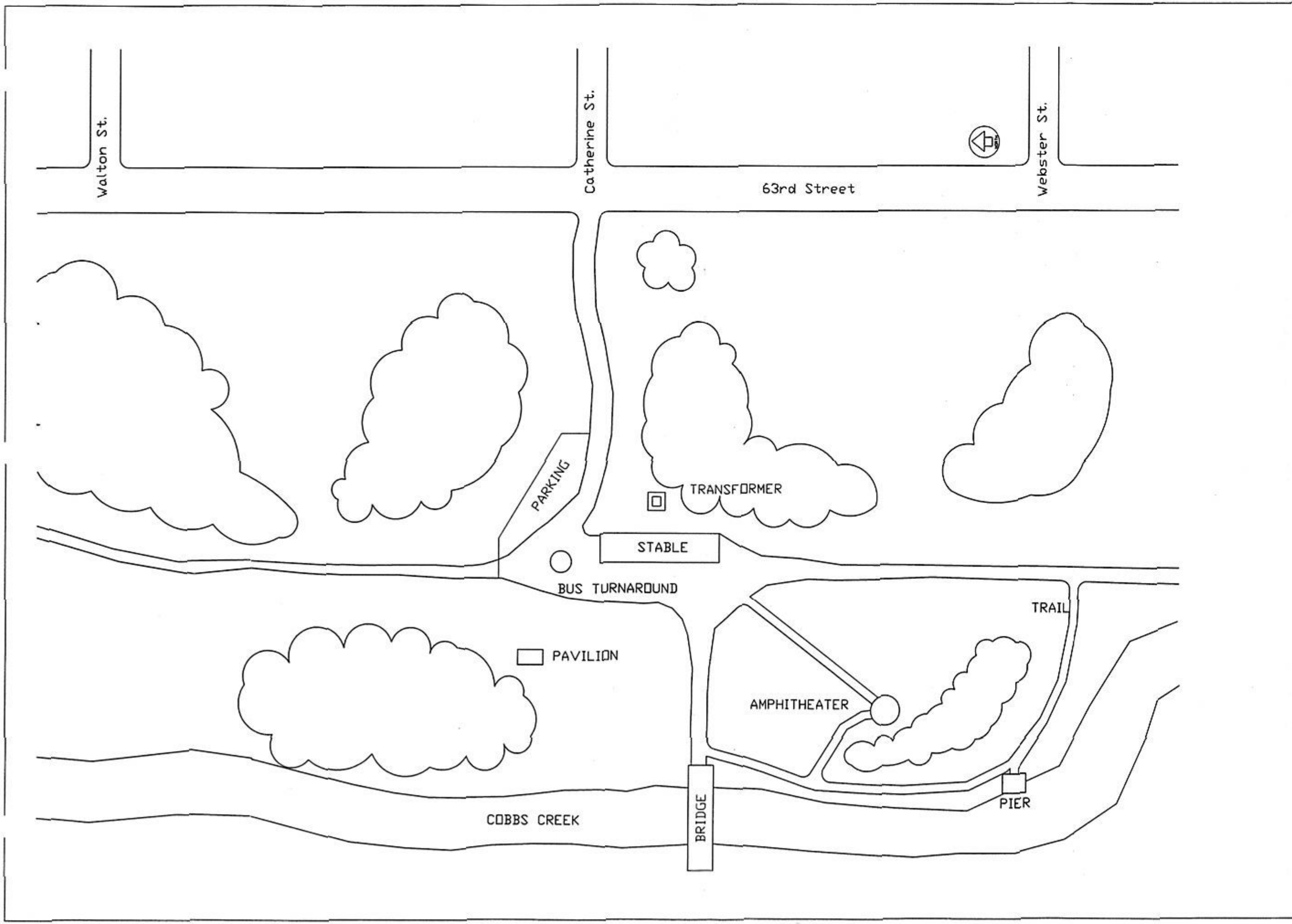
KABB Associates

Scale:
NO SCALE

26 MAY 2000

TITLE
SHEET

A-0



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

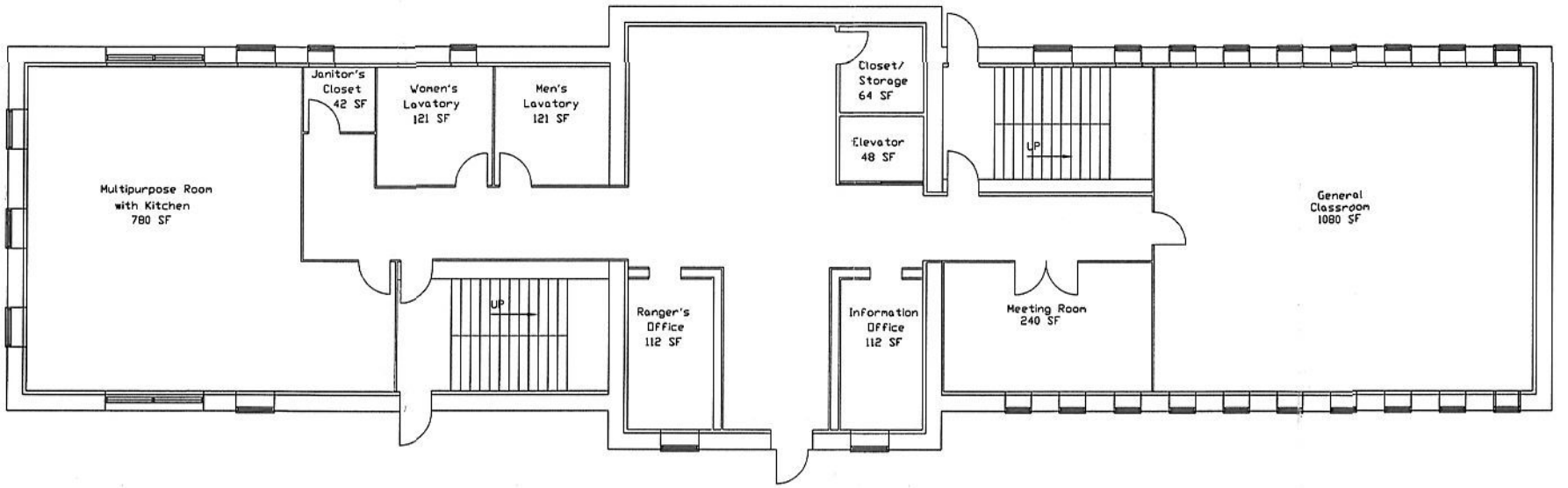
Associates

Scale:
1" = 100'

26 MAY 2000

SITE PLAN

S-1



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

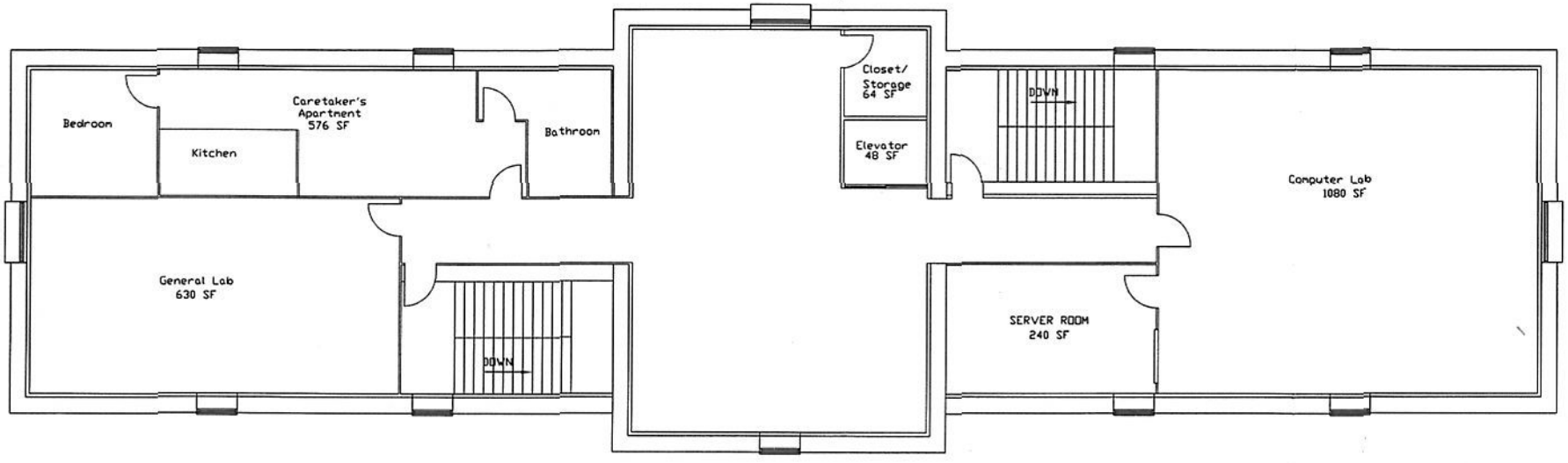
KABB Associates

Scale: 1/10" = 1'

26 MAY 2000

FIRST FLOOR ARCHITECTURAL

A-1



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

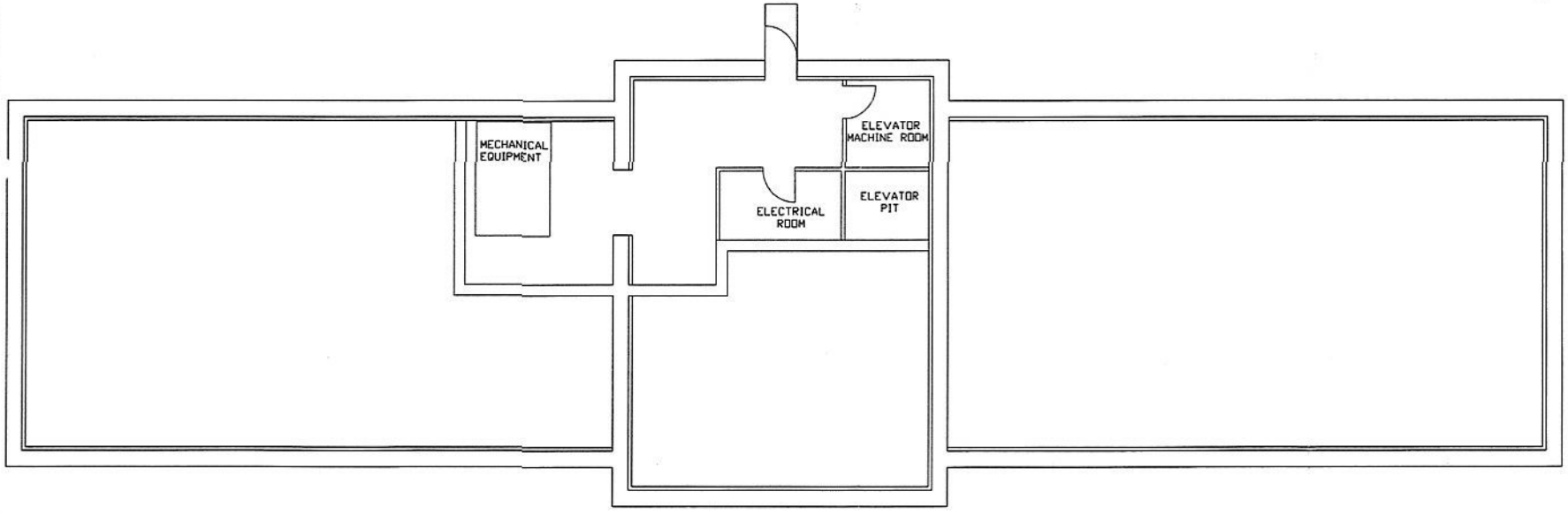
KABB Associates

Scale:
1/10" = 1'

26 MAY 2000

SECOND FLOOR
ARCHITECTURAL

A-2



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

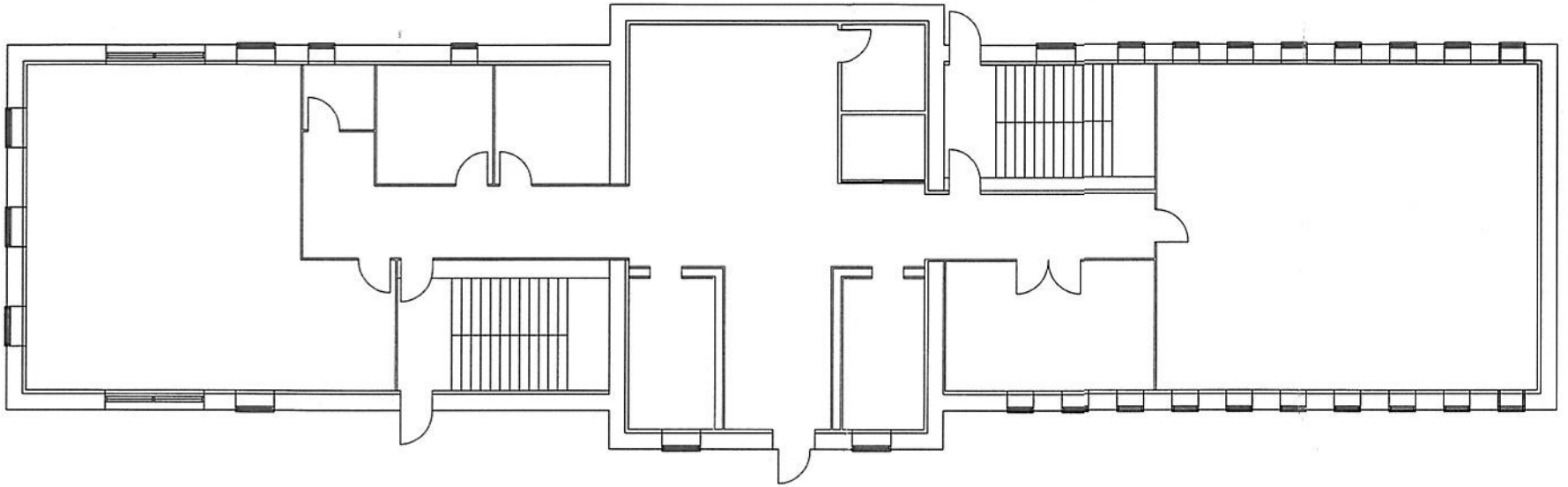
KABB Associates

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
ARCHITECTURAL

A-3



NOTES:

1. SEE ELECTRICAL LINE DIAGRAM FOR ELECTRICAL INFORMATION.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

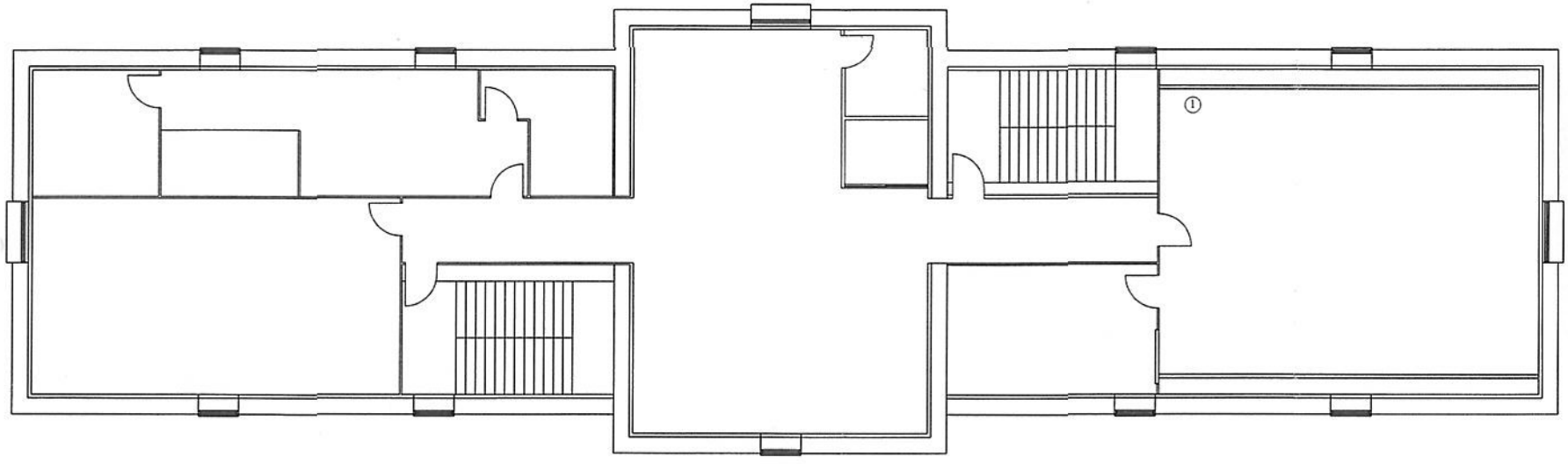
KABD Associates

Scale:
1/10" = 1'

26 MAY 2000

FIRST FLOOR
ELECTRICAL

E-1



NOTES:

1. CHASES WILL HAVE ALL COMPUTER WIRES RUNNING THROUGH THEM.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

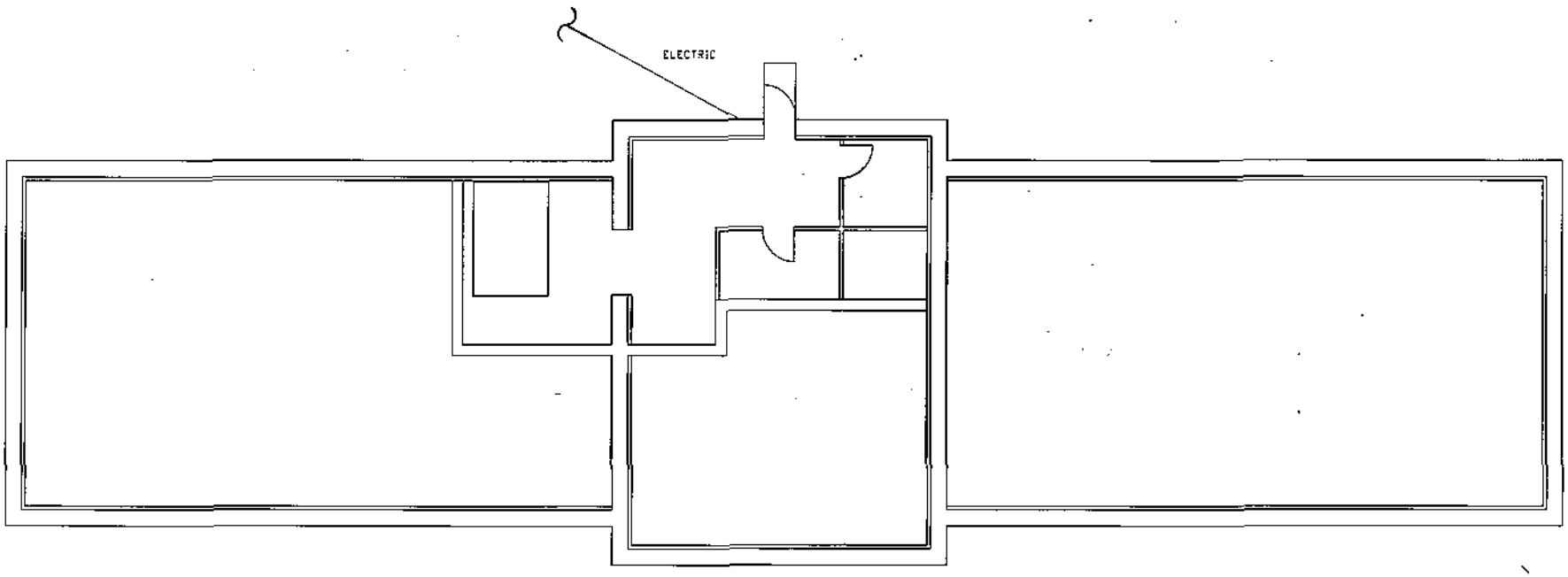
KABB Associates

Scale:
1/8" = 1'

26 MAY 2000

SECOND FLOOR
ELECTRICAL

E-2



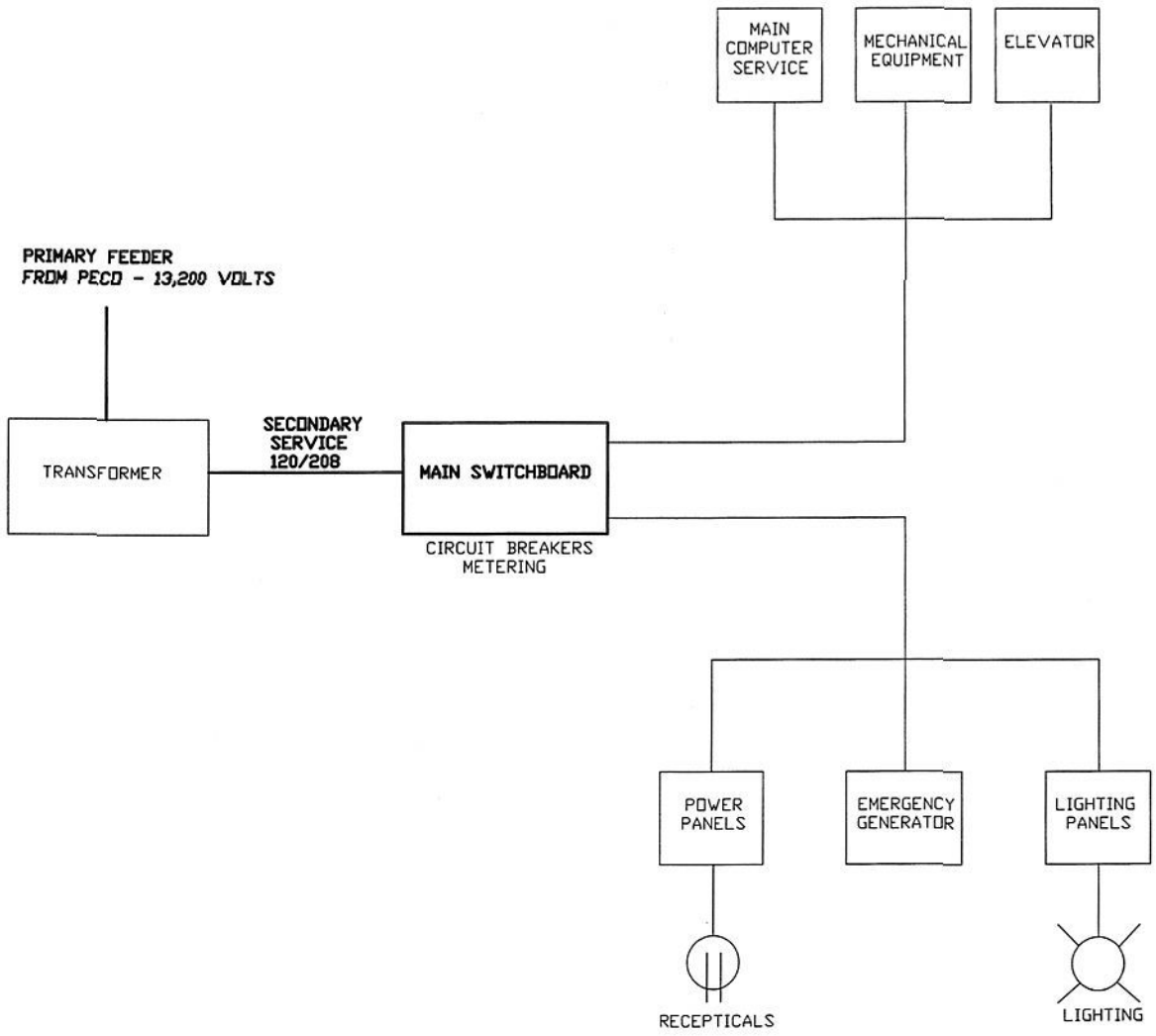
COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
ELECTRICAL

E-3



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

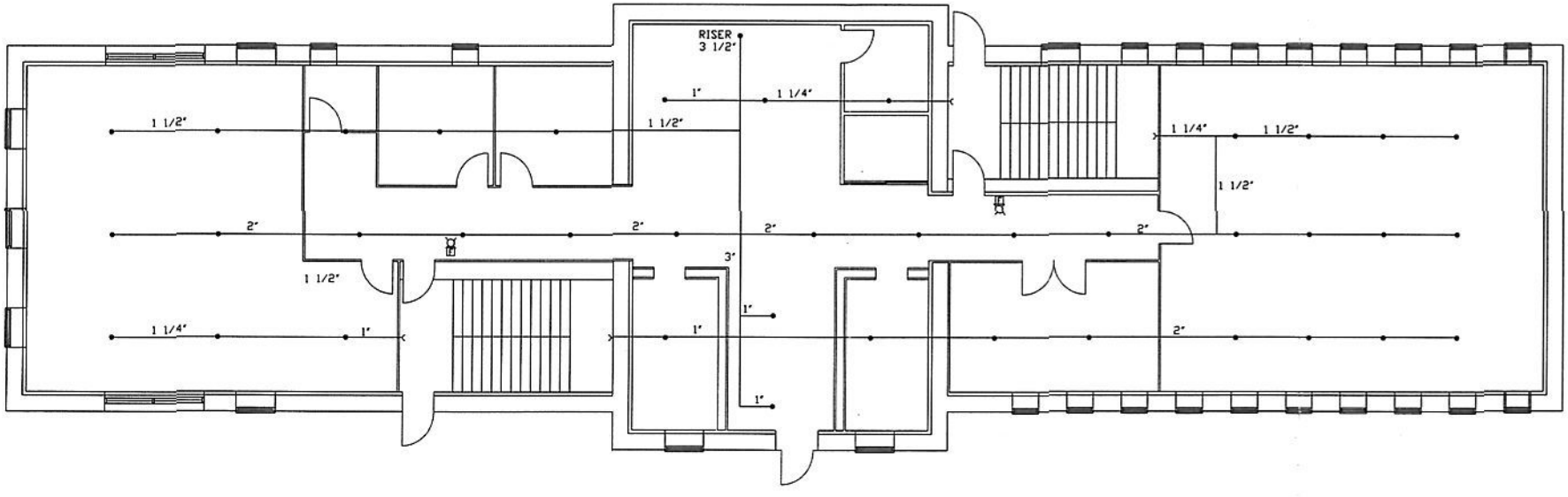
KARB Associates

Scale:
NO SCALE

26 MAY 2000

ELECTRICAL
LINE DIAGRAM

E-4



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

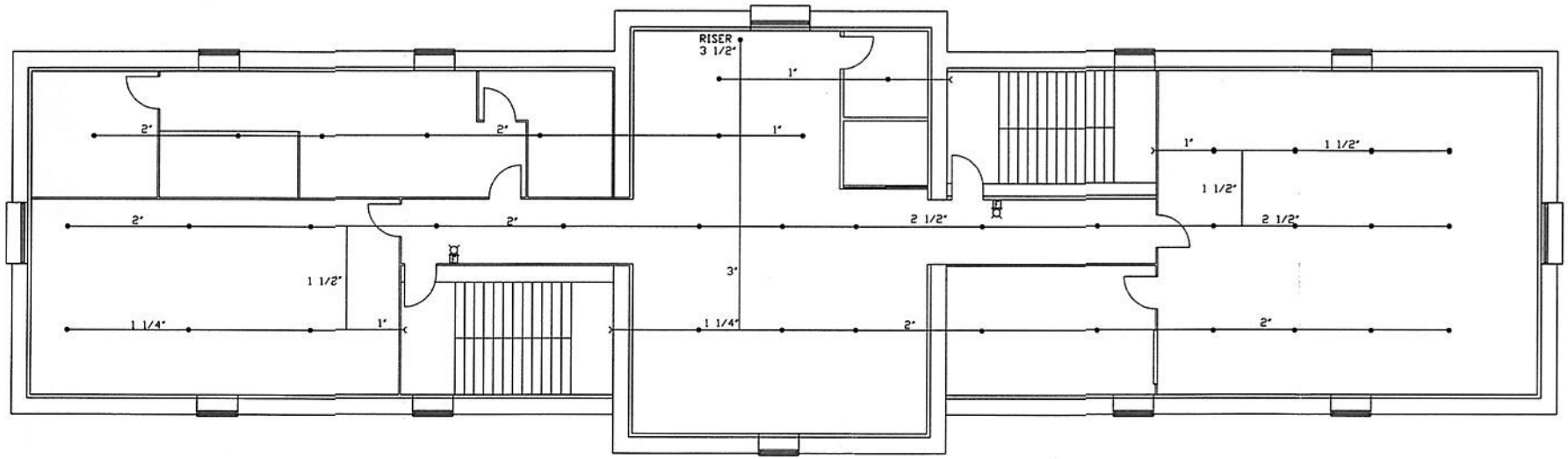
KABB Associates

Scale:
1/10" = 1'

26 MAY 2000

FIRST FLOOR
FIRE
PROTECTION

FP-1



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

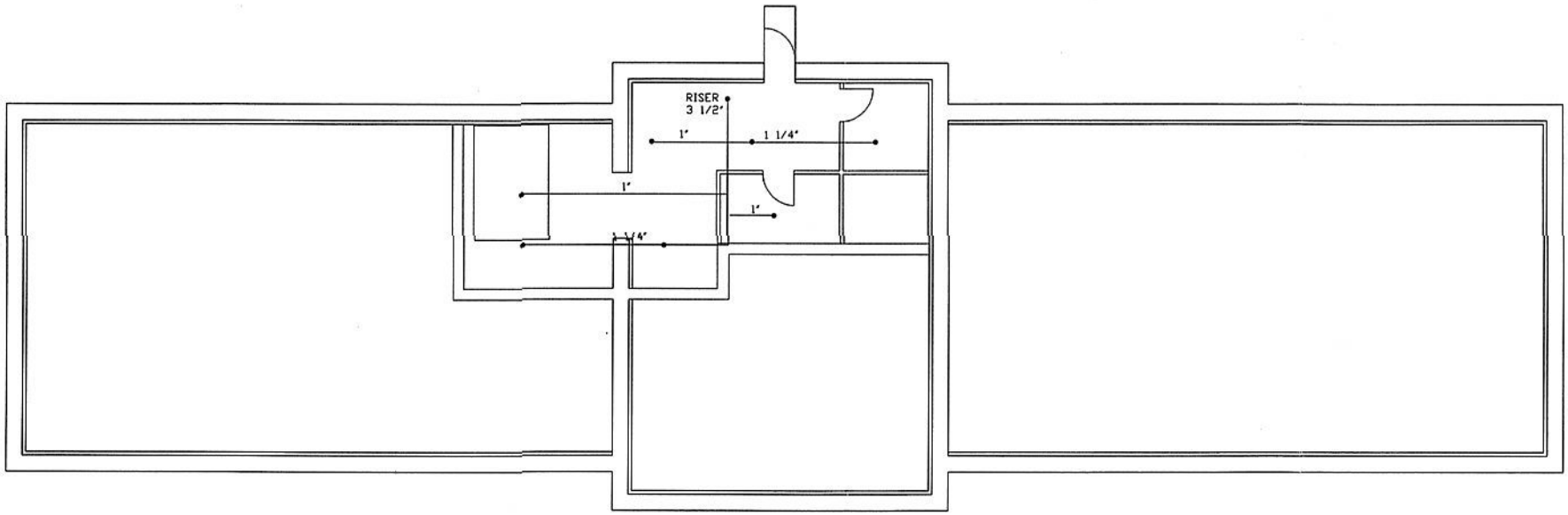
KABB Associates

Scale:
1/10" = 1'

26 MAY 2000

SECOND FLOOR
FIRE
PROTECTION

FP-2



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

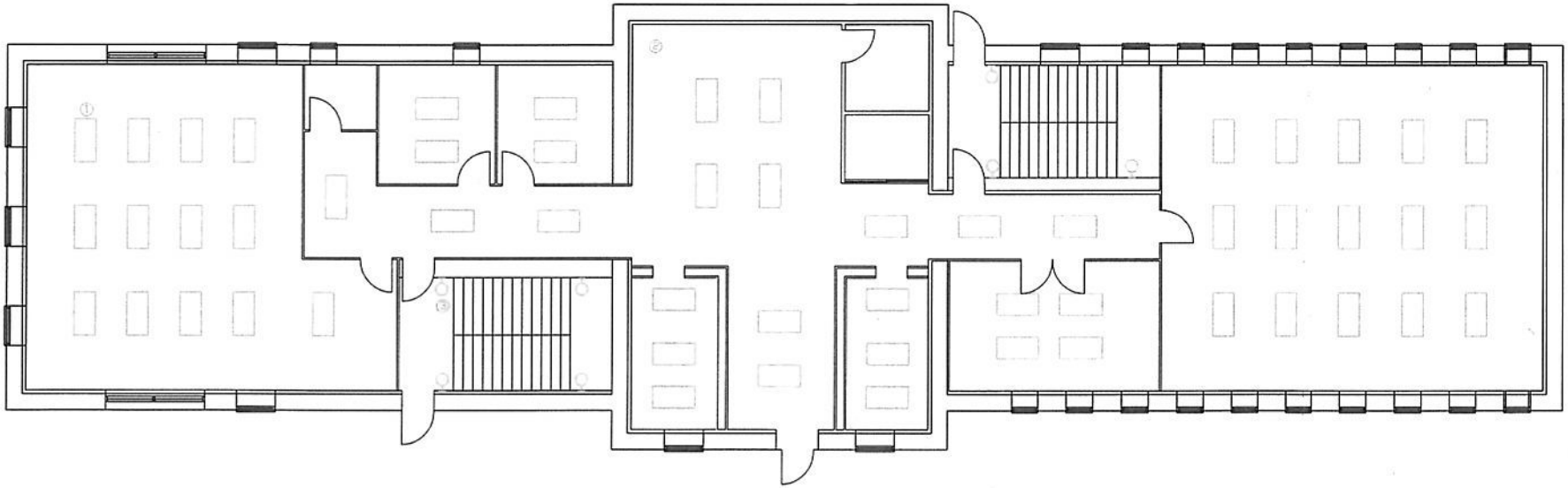
KABB Associates

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
FIRE
PROTECTION

FP-3



NOTES:

1. ALL LIGHTS WILL BE 2'X4' T-8 LUMINAIRES.
2. DISPLAY LIGHTING WILL BE IN DISPLAY FIXTURES.
3. STAIRWELL LIGHTING WILL BE WALL MOUNTED FIXTURES.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

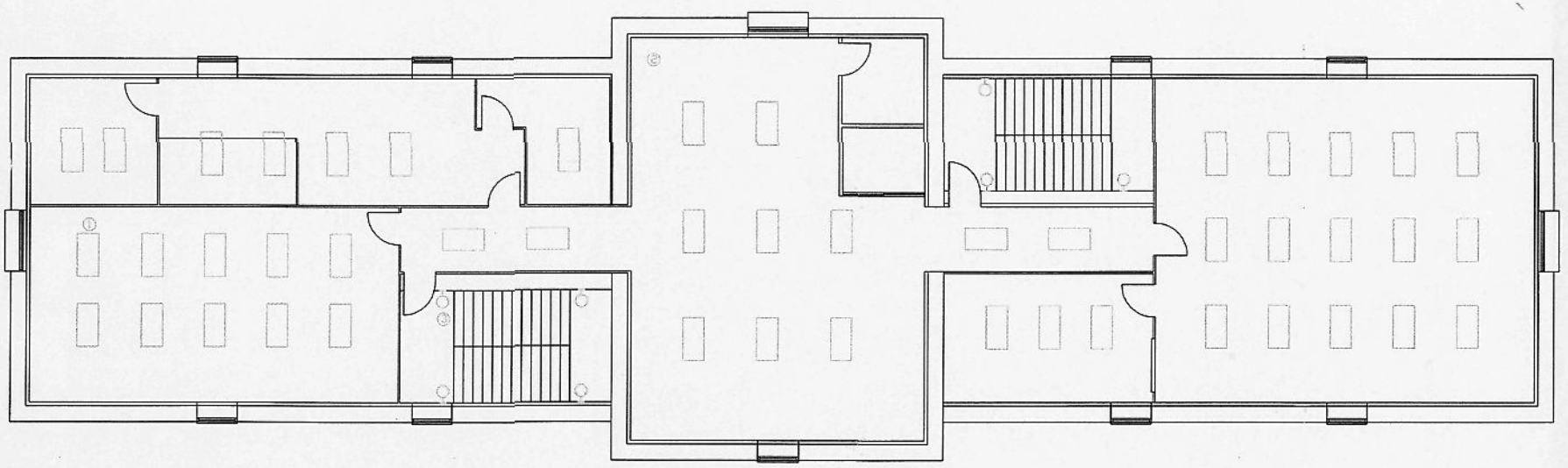
KARR Associates

Scale:
1/10" = 1'

26 MAY 2000

FIRST FLOOR LIGHTING

L-1



NOTES:

1. ALL LIGHTS WILL BE 2'X4' T-8 LUMINAIRES.
2. DISPLAY LIGHTING WILL BE IN DISPLAY FIXTURES.
3. STAIRWELL LIGHTING WILL BE WALL MOUNTED FIXTURES.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

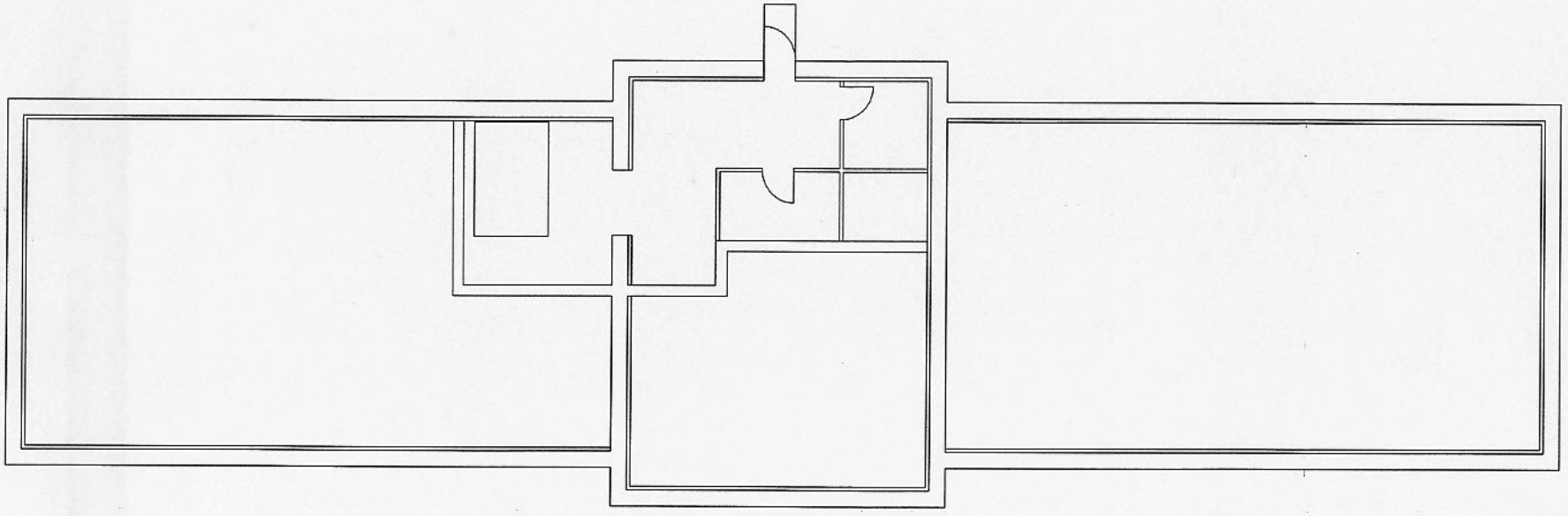
KYRA Associates

Scale:
1/10" = 1'

26 MAY 2000

SECOND FLOOR LIGHTING

L-2



NOTES:

1. LIGHTING WILL BE DETERMINED IN THE FIELD.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

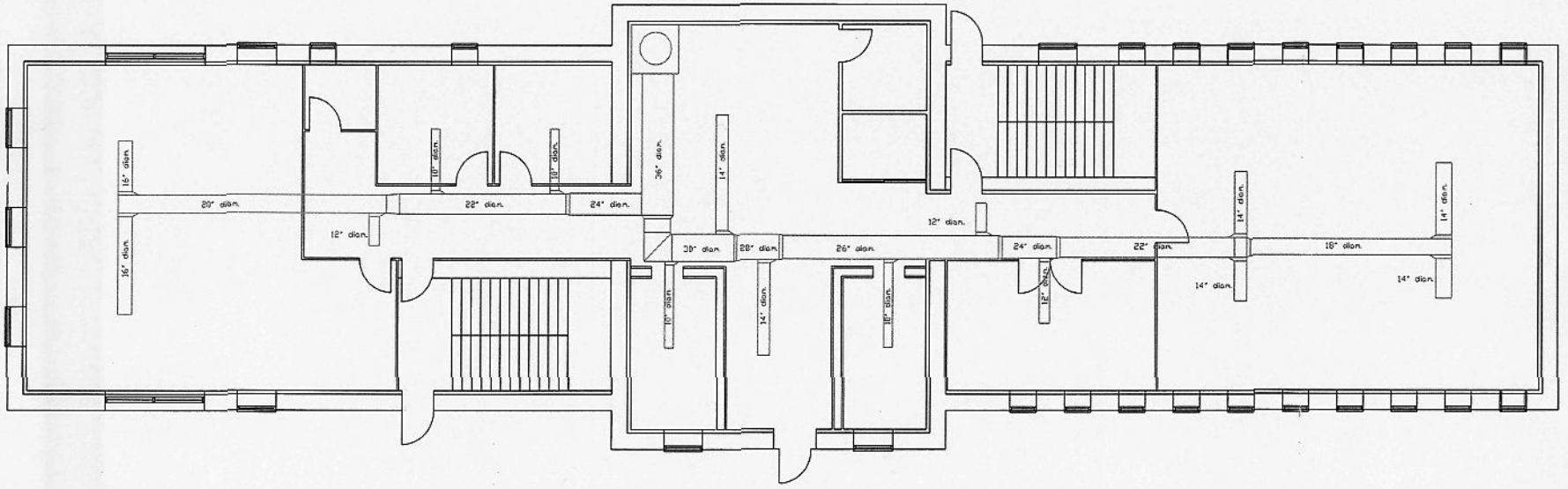
KIBBE Associates

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT LIGHTING

L-3



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

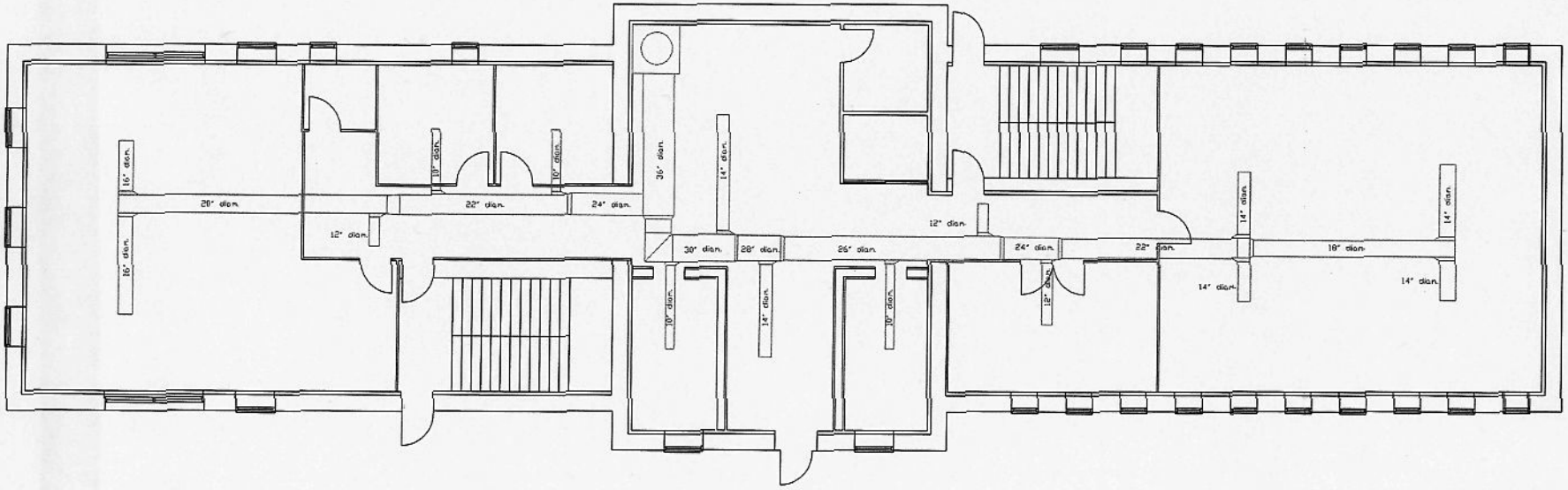
KABB Associates

Scale:
1/10" = 1'

26 MAY 2000

FIRST FLOOR
MECHANICAL

M-1



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

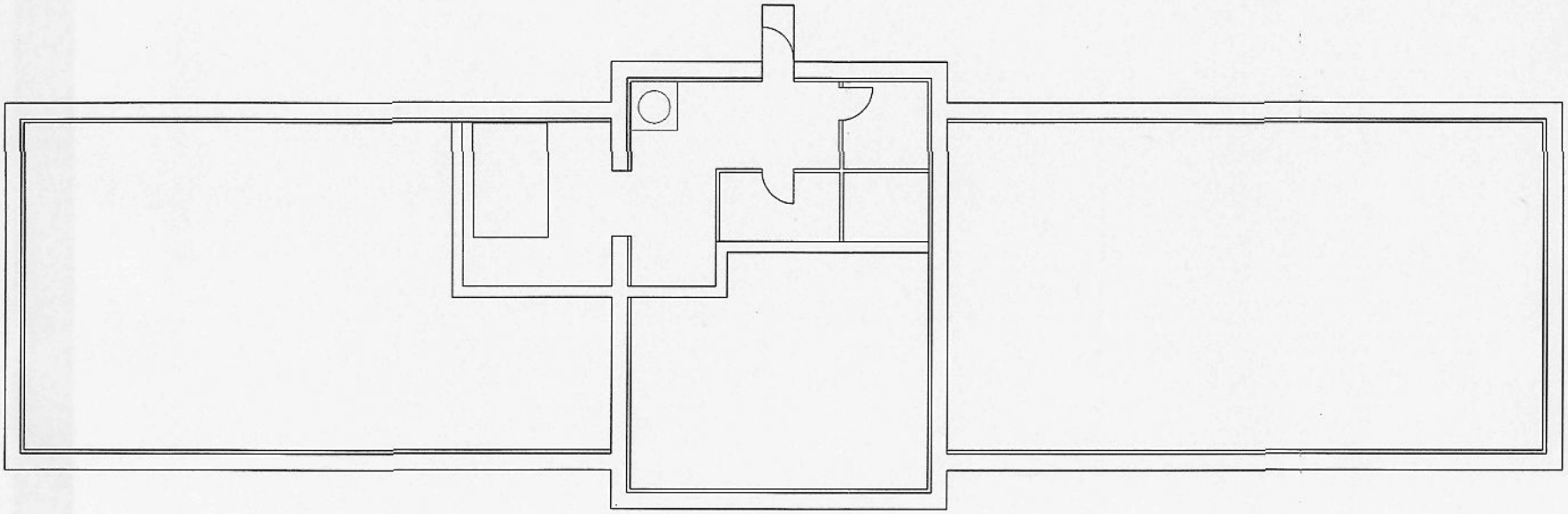
KARB Associates

Scale:
1/10" = 1'

26 MAY 2000

SECOND FLOOR
MECHANICAL

M-2



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

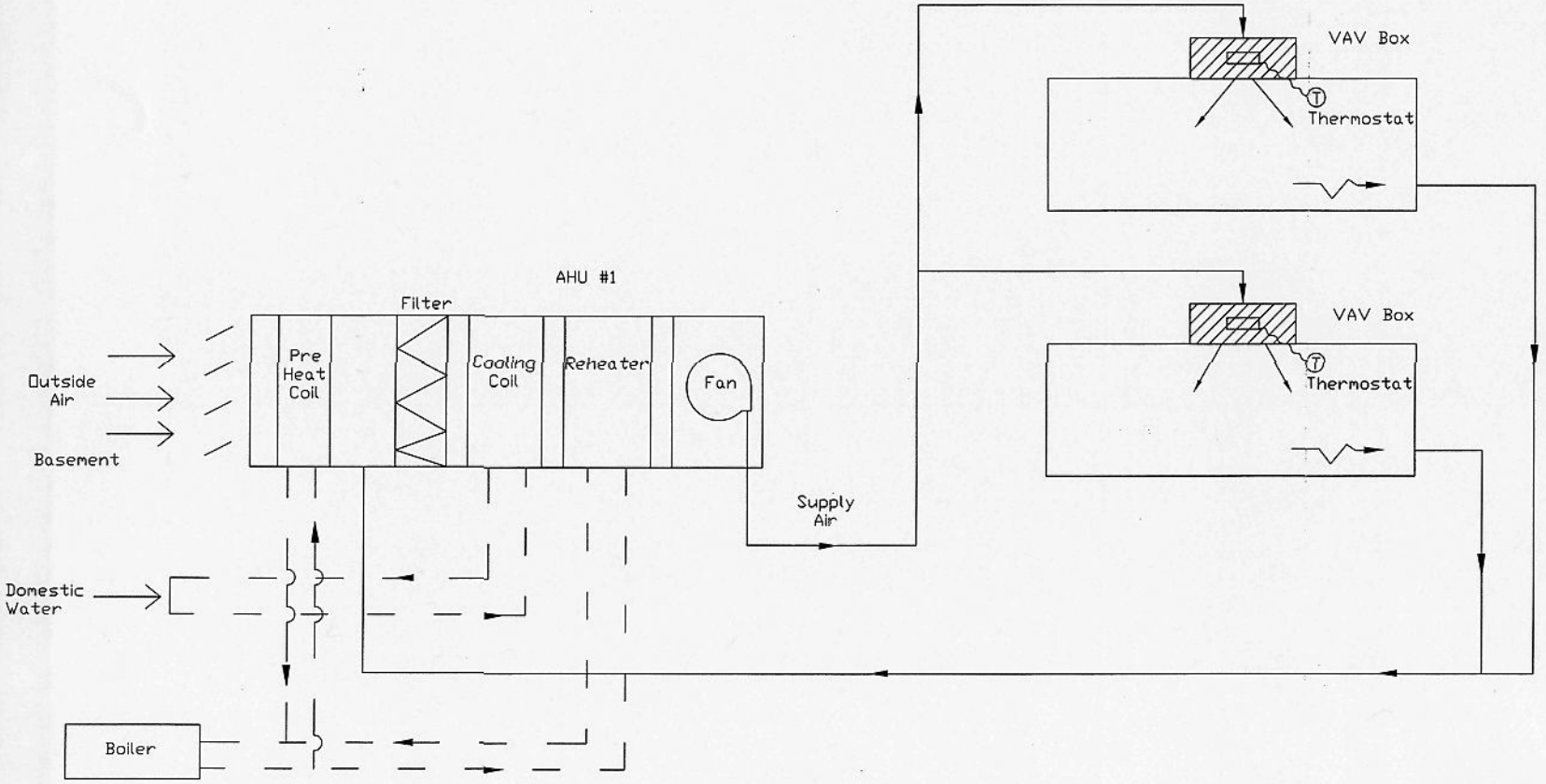
KARB Associates

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
MECHANICAL

M-3



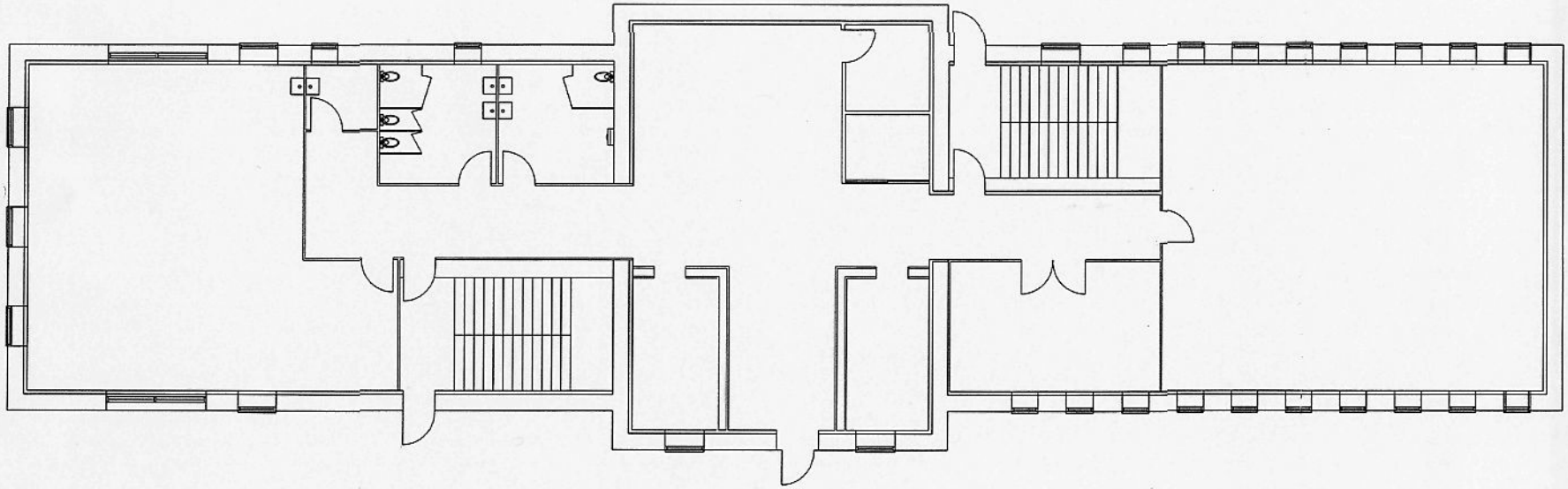
COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
NO SCALE

26 MAY 2000

MECHANICAL
LINE DIAGRAM

M-4



NOTES:

1. ALL FIXTURES TO BE SPECIFIED AT A LATER DATE.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

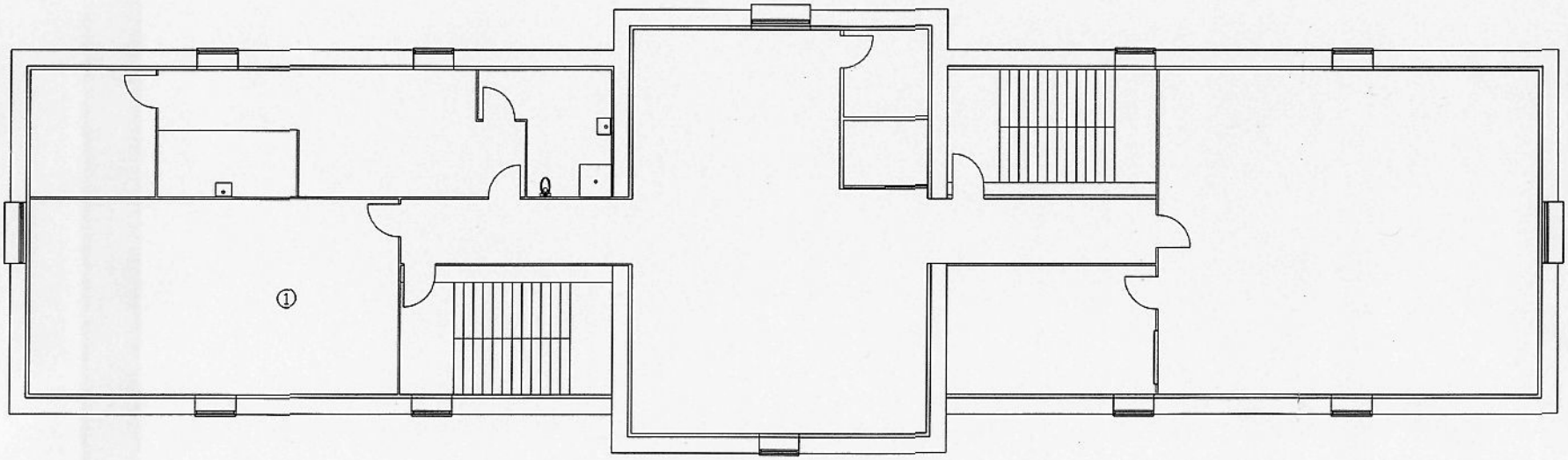
Associates

Scale:
1/10" = 1'

26 MAY 2000

FIRST FLOOR
PLUMBING

P-1



NOTES:

1. 6 SINKS WILL BE ADDED TO THE GENERAL LABORATORY WHEN LAB TABLES ARE BROUGHT IN.
2. ALL FIXTURES TO BE SPECIFIED AT A LATER DATE.

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

NORTH

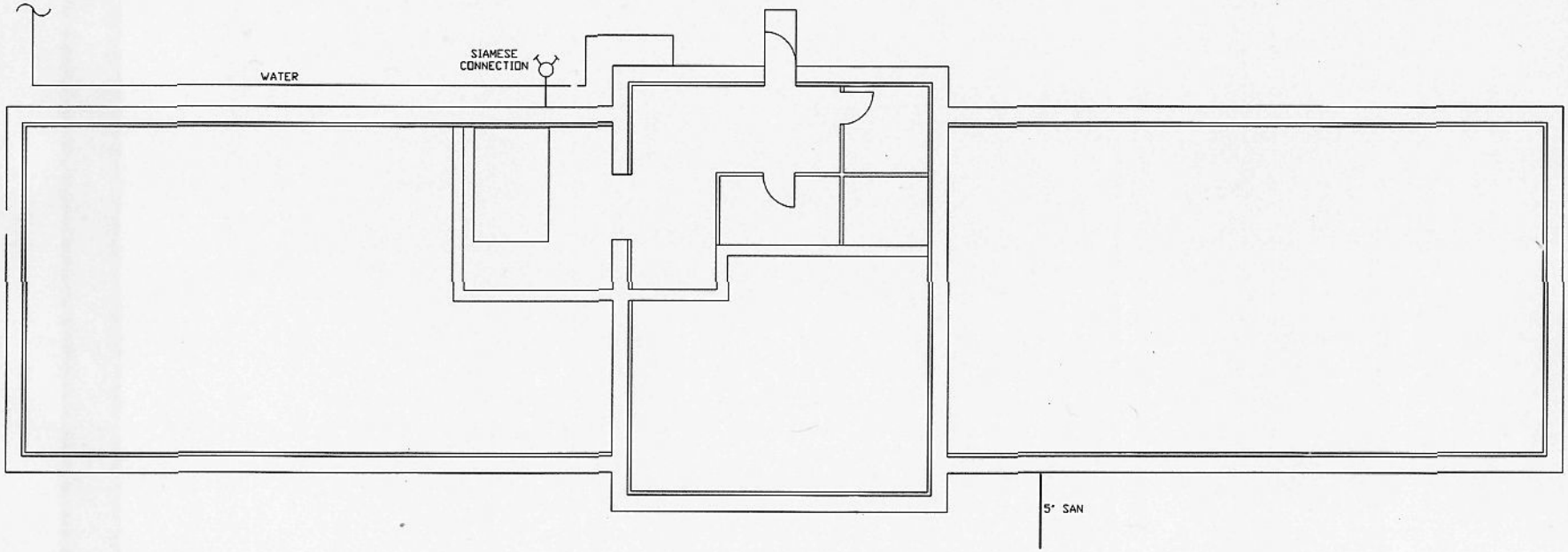
KMB Associates

Scale:
1/10" = 1'

26 MAY 2000

SECOND FLOOR
PLUMBING

P-2



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

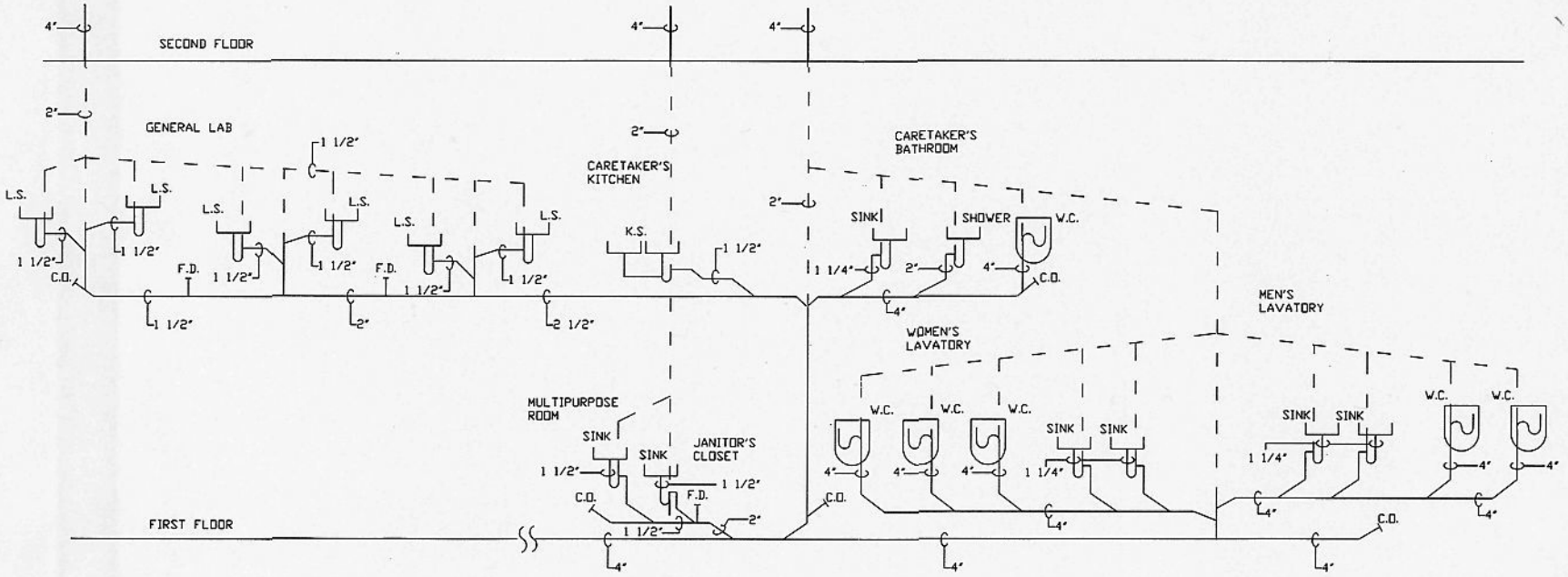
NORTH

Scale:
1/10" = 1'

26 MAY 2000

BASEMENT
PLUMBING

P-3



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

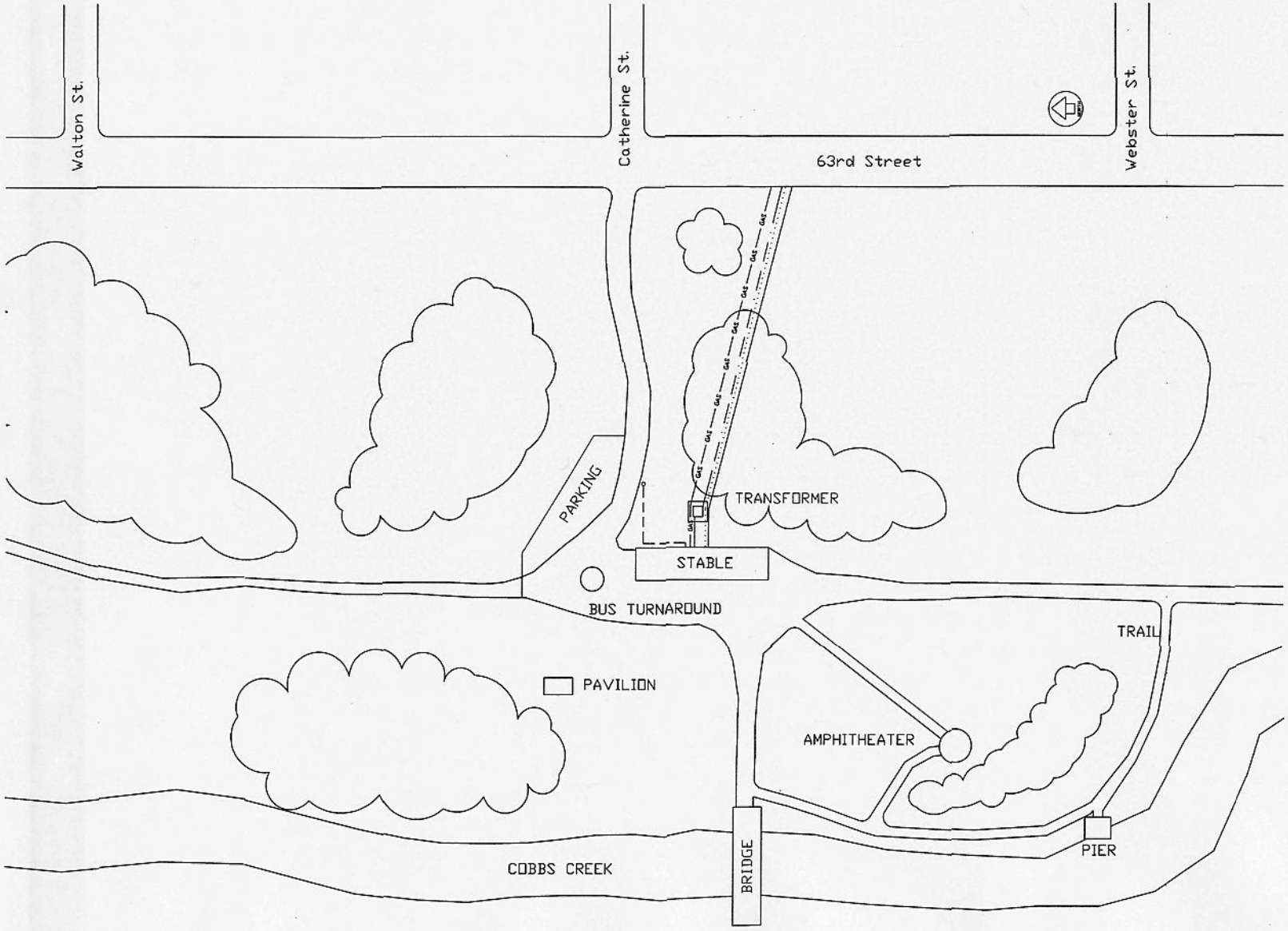
KABB Associates

Scale:
NONE

26 MAY 2000

PLUMBING
LINE DIAGRAM

P-4



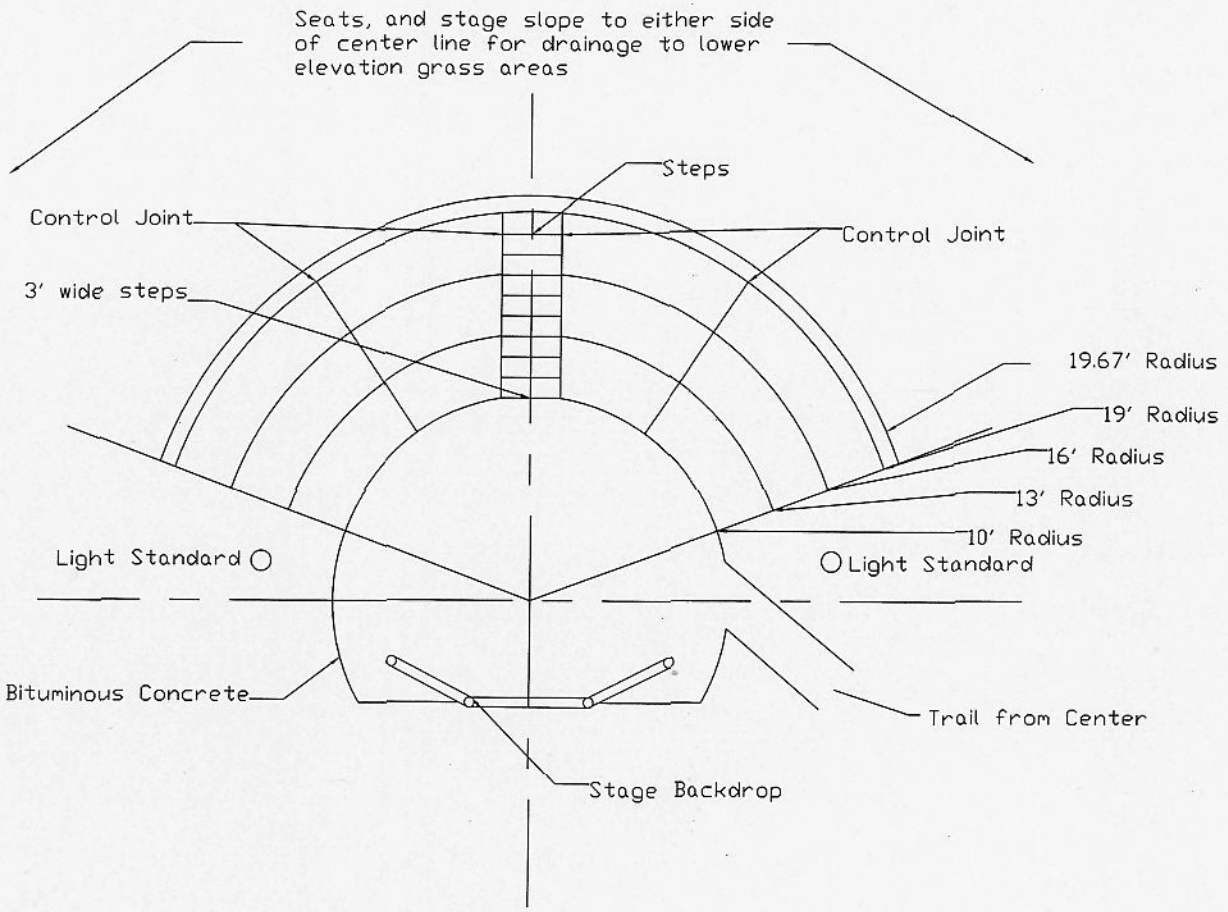
COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
1" = 100'

26 MAY 2000

UTILITIES
SITE PLAN

U-1



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

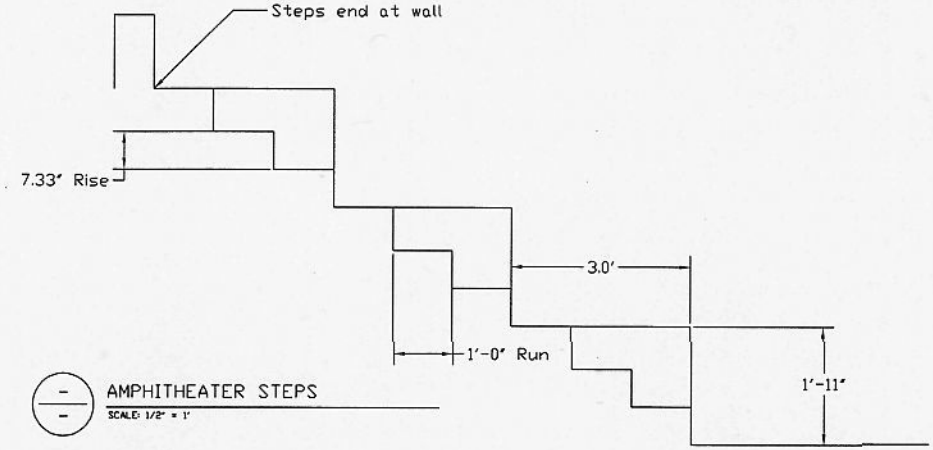
KMRB Associates

Scale:
1" = 2'

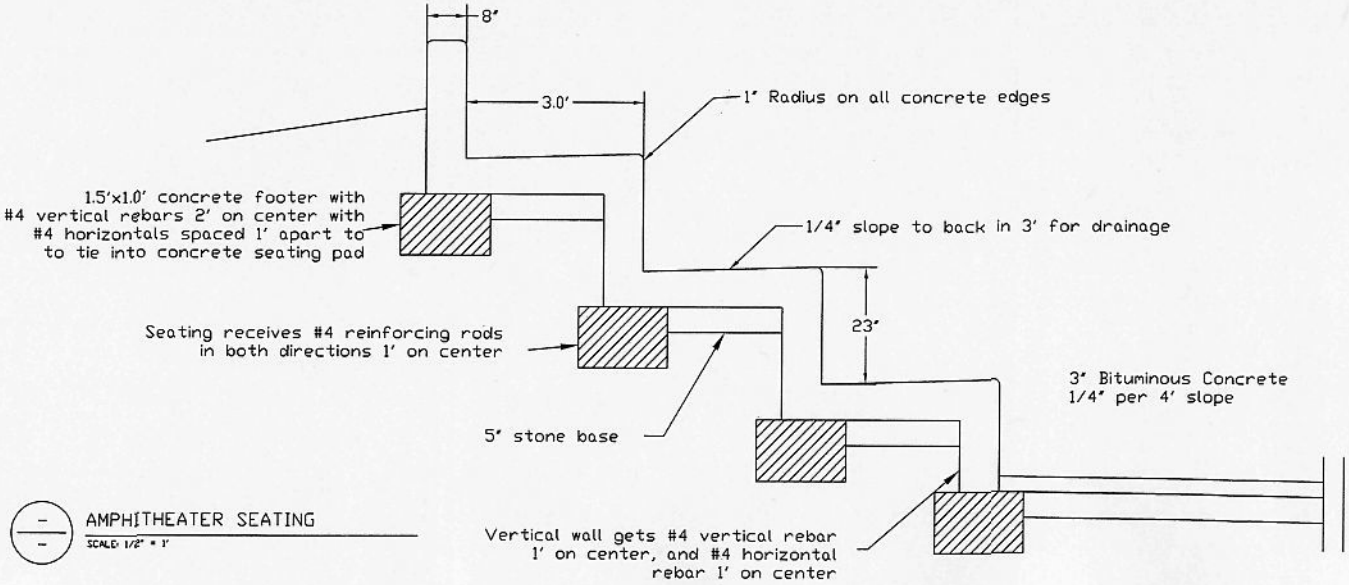
26 MAY 2000

AMPHITHEATER

DA-1



AMPHITHEATER STEPS
SCALE: 1/2" = 1'



AMPHITHEATER SEATING
SCALE: 1/2" = 1'

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

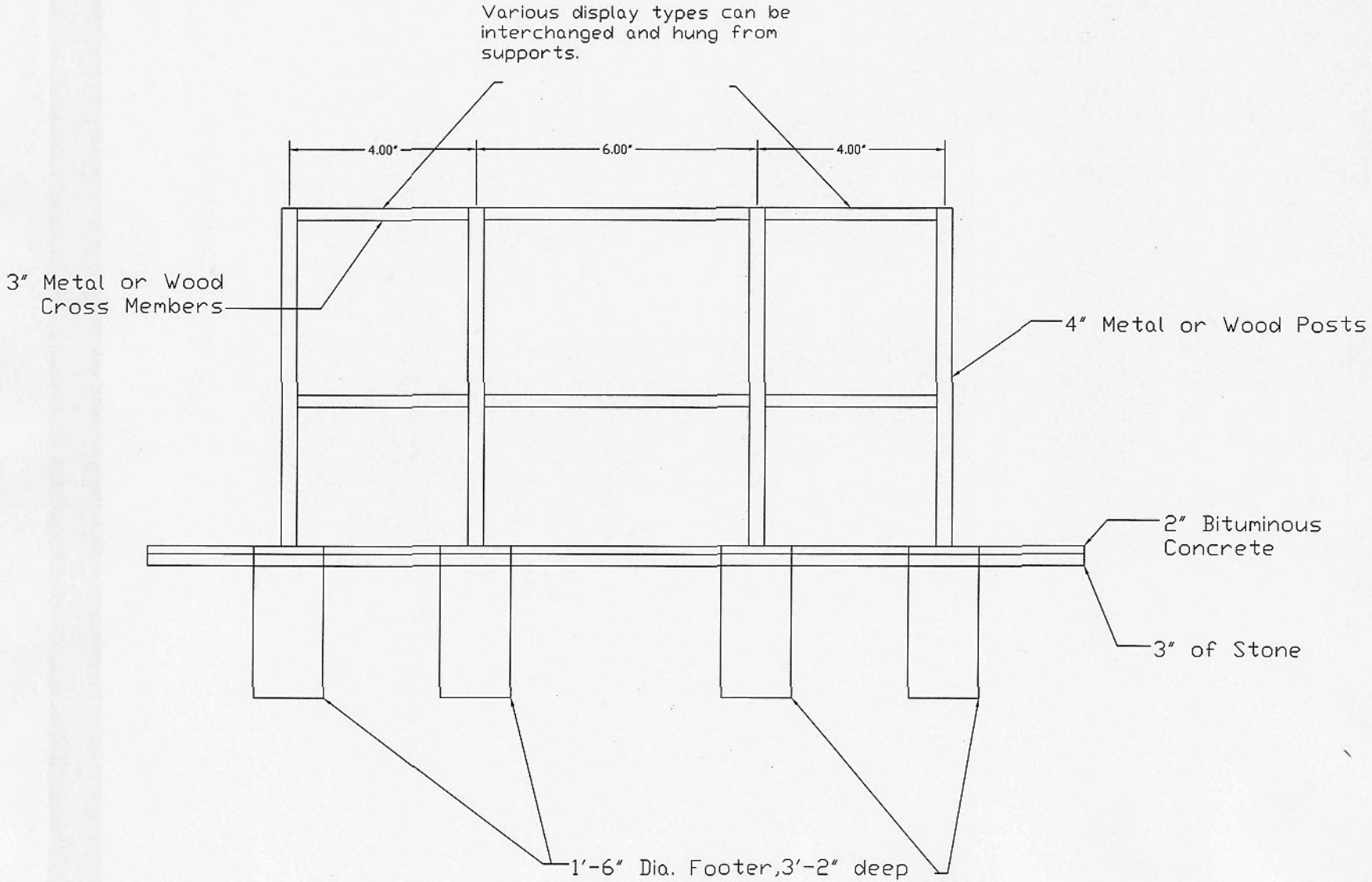
KABR Associates

Scale:
SEE DWG.

26 MAY 2000

AMPHITHEATER
DETAILS

OA-2



COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

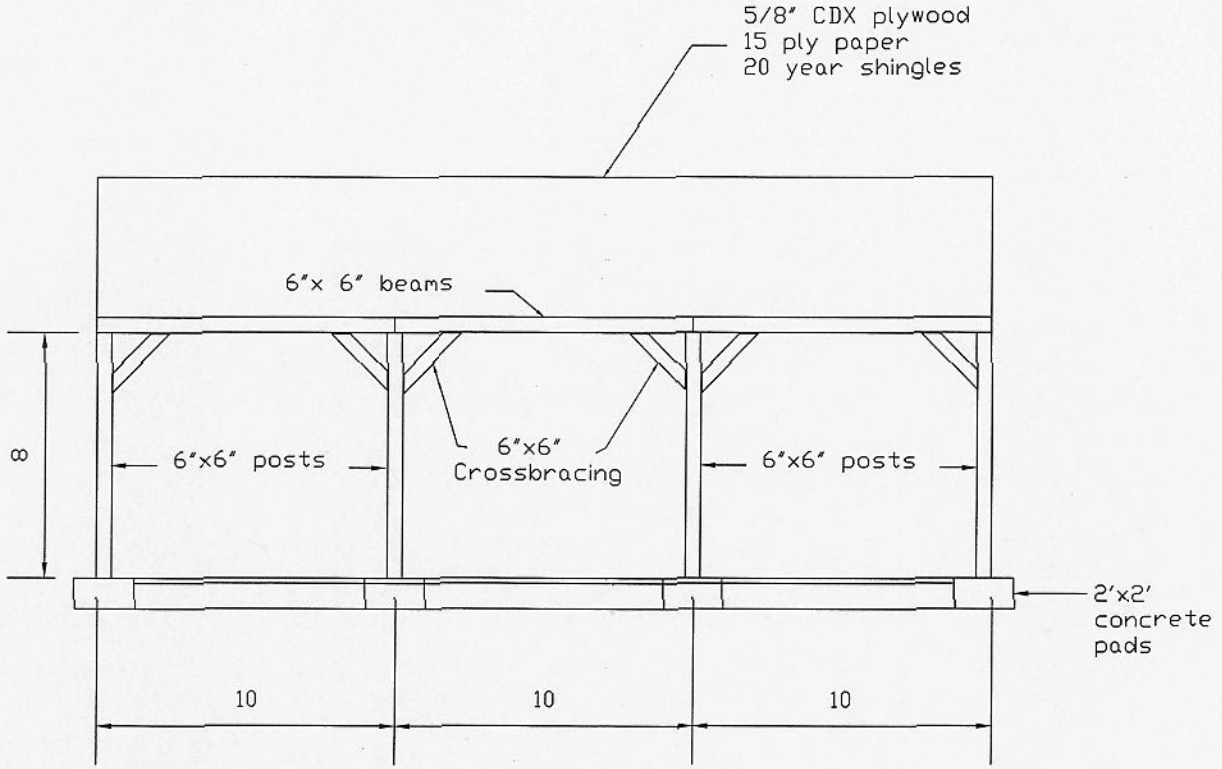
KARP Associates

Scale:
SEE DWG.

26 MAY 2000

AMPHITHEATER DETAILS

DA-3



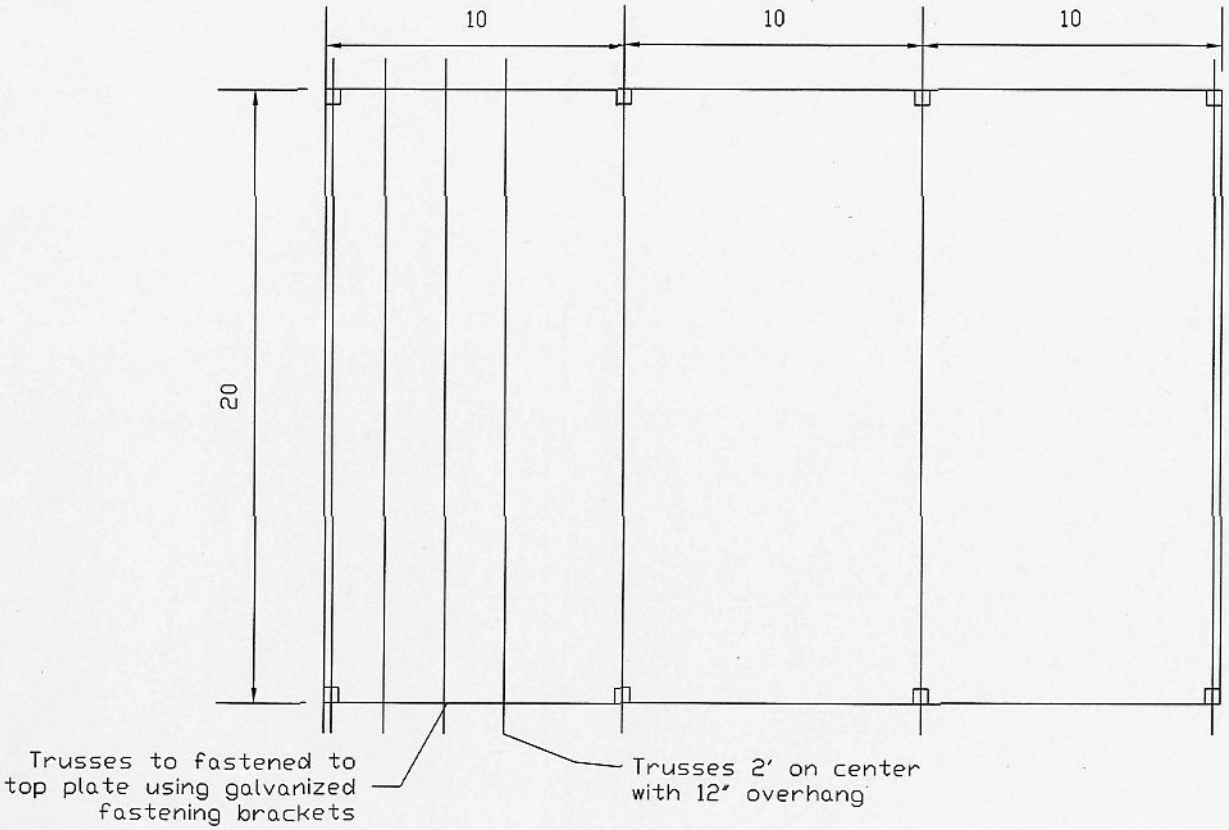
COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
1/4" = 1'

26 MAY 2000

PAVILION
SIDE VIEW

OP-1



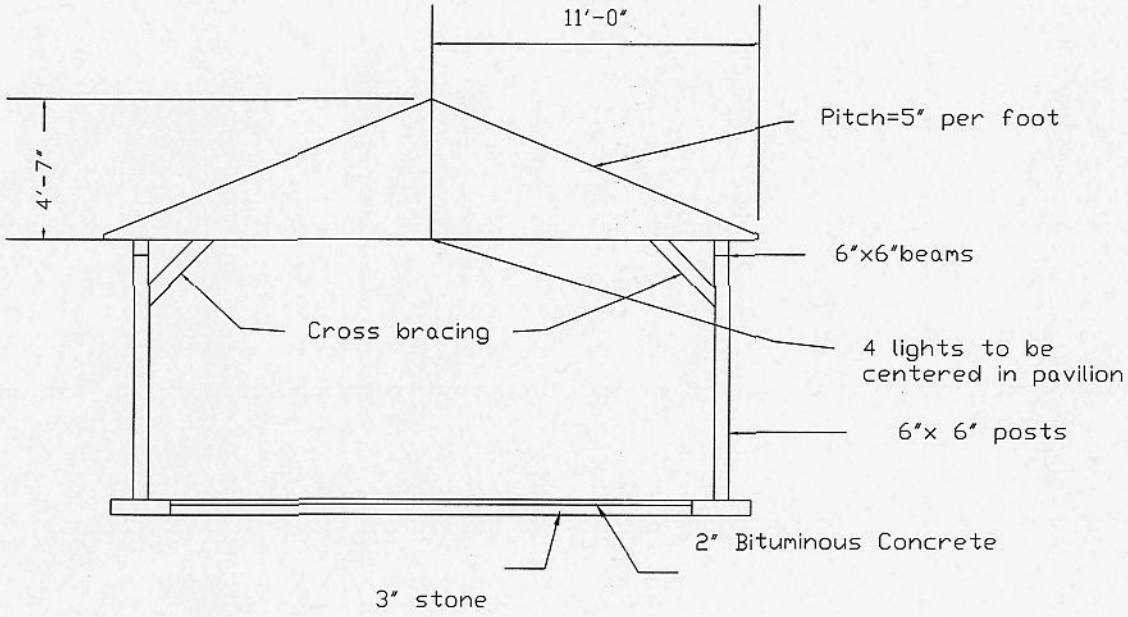
COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
1/4" = 1'

26 MAY 2000

PAVILION
TOP VIEW

OP-2



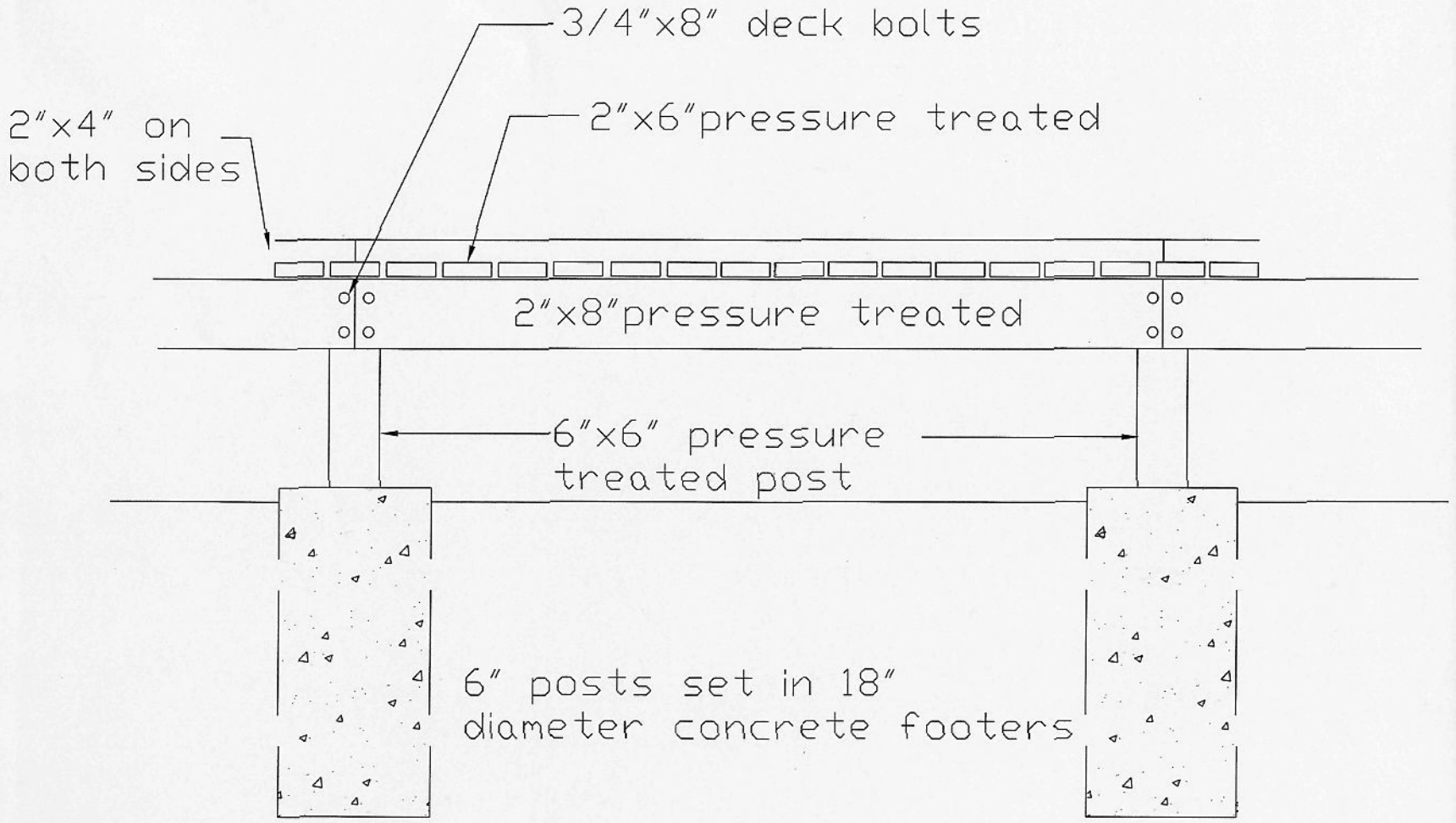
COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
1/4" = 1'

26 MAY 2000

PAVILION
FRONT VIEW

OP-3



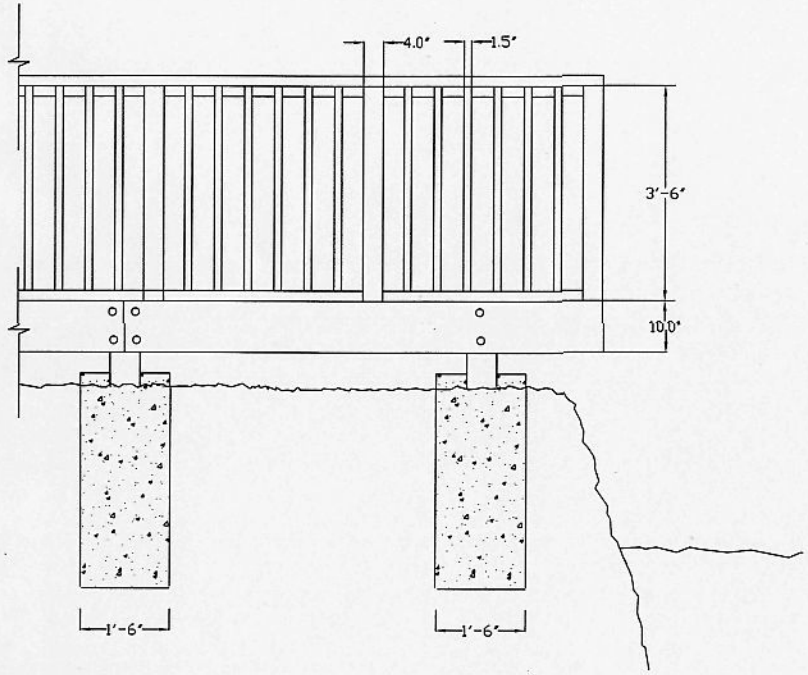
COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
1' = 1'

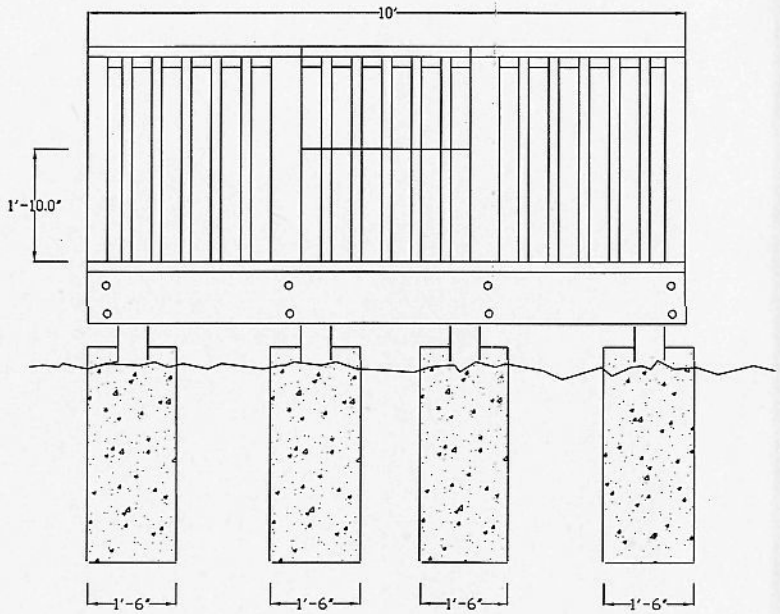
26 MAY 2000

TRAIL DETAILS

DT-1



OBSERVATION DECK - SIDE VIEW
SCALE: 1/2" = 1'



OBSERVATION DECK - FRONT VIEW
SCALE: 1/2" = 1'

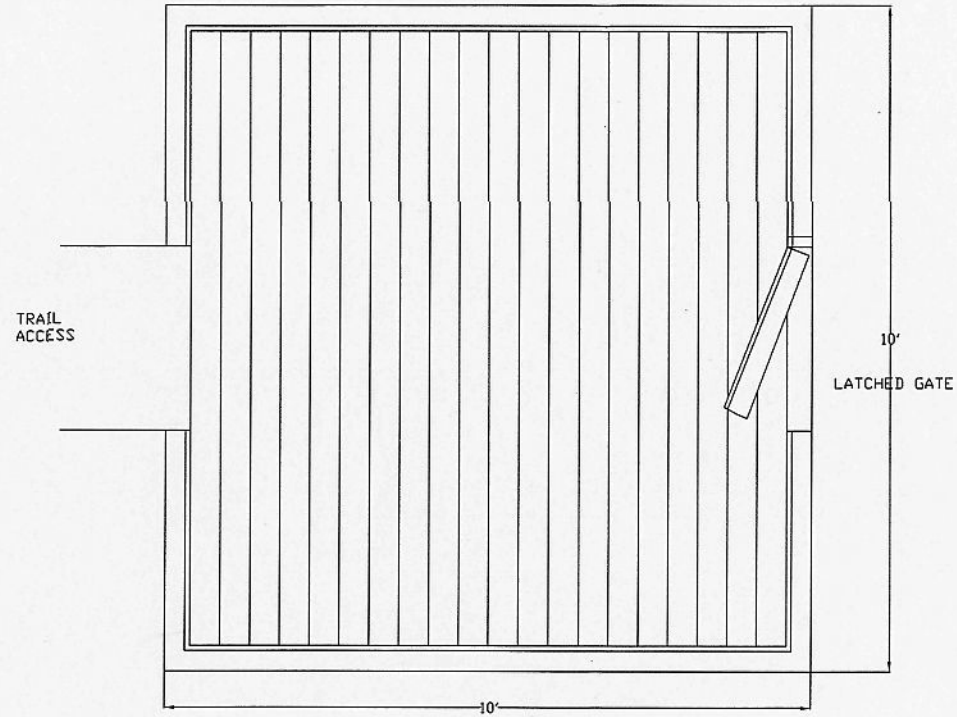
COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
SEE DWG.

26 MAY 2000

OBSERVATION DECK

OR-1



OBSERVATION DECK - TOP VIEW
SCALE: 1/2" = 1'

COBBS CREEK COMMUNITY
ENVIRONMENTAL EDUCATION CENTER
63RD AND CATHERINE STREETS
Philadelphia, PA

Scale:
SEE DWG.

26 MAY 2000

OBSERVATION
DECK

OR-2

APPENDIX XI

Cost Estimate

KARB Associates

Project: Cobbs Creek Community Environmental Education Center

Client: CCCEEC/Mrs. Williams

Date: May 26, 2000

Building Renovation Estimate

Items		Cost
General Conditions		$200,000.00
Demolition		$225,000.00
Rough Carpentry		$300,000.00
Finish Carpentry		$125,000.00
Doors & Hardware		$20,000.00
Glass & Glazing		$25,000.00
Drywall		$75,000.00
Roofing		$100,000.00
Concrete		$125,000.00
Masonry		$30,000.00
Ceilings		$30,000.00
Flooring		$85,000.00
Painting		$15,000.00
Toilets Accessories		$1,000.00
Fire Protection		$20,000.00
Plumbing		$200,000.00
Mechanical		$250,000.00
Electrical		$175,000.00
SubTotal		$2,001,000.00
OverHead & Fee	5%	$100,050.00
Total Cost		**$2,101,050.00**

Amphitheater

Type	Quantity	Cost/lf ($)	Total cost ($)
Concrete slab (cy)	18	$75.00	$1,350.00
Concrete footers (cy)	17	$75.00	$1,275.00
Bituminous Concrete (sy)	90	$8.00	$720.00
Excavation/stone	NA	NA	$2,000.00
# 4 Rebar	64	$2.84	$181.76
Sealer	NA	NA	$200.00
Forms	NA	NA	$200.00
Stage backdrop	NA	NA	$2,500.00
Electrical	N/A	N/A	$3,000.00
		Total	**$11,426.76**

Union labor rates are being used

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
Laborer	Pour concrete	$38.00	48.0	$1,824.00
Concrete Finishers	Finish concrete	$45.00	48.0	$2,160.00
Carpenter	Formwork	$48.00	48.0	$2,304.00
Iron Worker	Steel work	$48.00	32.0	$1,536.00
			Total	**$7,824.00**

Total Cost of Amphitheater = **$19,250.76**

Pavilion

All lumber is pre-treated and southern pine

Type	Quantity (lf) (cy)	Cost/lf ($)	Total cost ($)
2"x 4" trusses	30	$75.00	$2,250.00
6" x 6" plates	64	$2.84	$181.76
6" x 6" columns	64	$2.84	$181.76
6" x 6" bracing	40	$2.84	$113.60
2" x 6"	40	$0.93	$37.20
5/8" Plywood	25	$23.79	$594.75
1"x 2" trim	N/A	N/A	$40.00
Shingles	8	$26.00	$208.00
Electrical	N/A	N/A	$3,000.00
Angle iron	N/A	N/A	$30.00
T-111	6	$27.79	$166.74
Concrete	8	$90.00	$720.00
Stone floor	N/A	N/A	$200.00
Hardware			$25.00
Equipment Rental			$28.00
		Total	$7,776.81

Union labor rates are being used

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
laborer	Pads	$38.00	16.0	$608.00
laborer	Poor Concrete	$38.00	8.0	$304.00
laborer	Material/cleanup	$38.00	32.0	$1,216.00
Carpenter	Layout	$48.00	5.0	$240.00
Carpenter	Framing	$48.00	48.0	$2,304.00
Carpenter	Roofing	$48.00	48.0	$2,304.00
			Total	$6,976.00

Total Cost of Pavilion = **$14,752.81**

Environmental Trail

Materials are being considered for 300 feet of trail using pretreated Southern Pine

Estimate will be taken from an 8' section of trail and then calculated for entire length

Type	Quantity (lf)	Cost/lf ($)	Total cost ($)
2" x 8"	16	$1.03	$16.48
6" x 6"	10	$2.84	$28.40
2" x 6"	90	$0.93	$83.70
2" x 4"	24	$0.65	$15.60
Hardware			$25.00
Equipment Rental			$28.00
		Total	$197.18
	Cost per lineal foot of trail		**$24.65**

Estimate of Labor per 8' section of trail Union labor rates are being used

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
laborer	Auger holes	$38.00	1.0	$38.00
laborer	Poor Concrete	$38.00	1.0	$38.00
laborer	Material/cleanup	$38.00	0.5	$19.00
Carpenter	Layout	$48.00	0.5	$24.00
Carpenter	Set posts & brace	$48.00	1.0	$48.00
Carpenter	*Frame & deck*	*$48.00*	*3.0*	*$144.00*
			Total	$311.00
		Cost per lineal foot of trail		**$38.88**

Total Cost of Deck = ($24.65 + $38.88) * 300 = **$19,056.75**

Observation Deck

Materials are being considered for 10 x 10 feet deck using pretreated Southern Pine

Type	Quantity (lf)	Cost/lf ($)	Total cost ($)
2" x 8"	60	$1.03	$61.80
6" x 6"	40	$2.84	$113.60
2" x 6"	200	$0.93	$186.00
2" x 4"	70	$0.65	$45.50
4" x 4"	49	$1.05	$51.45
1" x 4"	40	$0.70	$28.00
1" x 1.5"	231	$0.75	$173.25
Hardware			$150.00
Equipment Rental			$28.00
		Total	$837.60

Union labor rates are being used

Auger holes and concrete pour will be completed in conjunction with environmental trail.

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
laborer	Material/cleanup	$38.00	16.0	$608.00
Carpenter	Layout	$48.00	1.0	$48.00
Carpenter	*Frame & deck*	*$48.00*	*15.0*	*$720.00*
			Total	$1,376.00

Total Cost of Deck = ($837.60 + $1376.00) = **$2,213.60**

Parking Estimate

Materials are being considered for 5,400 sq. ft. of existing pavement and 8,000 sq. ft. new.

Existing Pavement:

Type	Quantity (sq. yd.)	Cost/sq. yd.	Total cost ($)
2" FA-BC Surface Course	600	$3.58	$2,148.00
		Total	$2,148.00

New Pavement:

Type	Quantity (sq. yd.)	Cost/sq. yd.	Total cost ($)
4" Aggregate	891	$4.55	$4,054.05
4" Bit. Stab. Base Course	891	$6.76	$6,023.16
2" FA-BC Surface Course	891	$3.58	$3,189.78
		Total	$13,266.99

Concrete Curbing:

Type	Quantity (lf.)	Cost/lf	Total cost ($)
Curb & Gutter	300	$14.30	$4,290.00
		Total	$4,290.00

Equipment	Quantity	Rate ($)	Time (daily)	Total cost ($)
Asphalt Paver	1	$1,309.00	4	$5,236.00
Rollers, Steel Wheel	1	$224.00	4	$896.00
			Total	$6,132.00

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
Labor Foreman	Supervisor	$38.15	24.0	$915.60
3 Labors	Layout	$35.00	24.0	$2,520.00
2 Equip. Oper.	Applying	$43.80	24.0	$2,102.40
			Total	$5,538.00

Total Cost of Parking= **$31,374.99**

Drainage (Storm Sewer) Estimate

Materials are being considered for drainage of 13,400 sq. ft. of impervious area.

Drainage (Storm Sewer) Inlets:

Type	Quantity (ea.)	Cost/ea.($)	Total cost ($)
Inlet Type "B" (0-8' DP.)	3	$1,300.00	$3,900.00
		Total	$3,900.00

Drainage (Storm Sewer) Pipe:

Type	Quantity (lf.)	Cost/lf.($)	Total cost ($)
12" R.C.P., Cl. III T&G	410	$16.90	$6,929.00
		Total	$6,929.00

Equipment	Quantity	Rate ($)	Time (daily)	Total Cost ($)
Backhoe	1	$203.00	2	$406.00
			Total	$406.00

Labor type	Description	Rate ($)	Time (hrs)	Total cost ($)
Labor Foreman	Material/cleanup	$38.15	24.0	$915.60
3 Labors	Layout	$35.00	24.0	$2,520.00
Equip. Oper.	Frame & deck	$42.00	24.0	$1,008.00
			Total	$4,443.60

Total Cost of Drainage = **$15,678.60**

Total construction cost

Item	Cost
Stable renovation	$2,101,050.00
Amphitheater	$19,250.76
Pavilion	$14,752.81
Environmental trail	$19,056.75
Observation deck	$2,213.60
Parking	$31,374.99
Drainage	$15,678.60

Subtotal	$2,203,377.51
Permits	$28,610.00
Overhead Fees (5%)	$111,599.38
Total	$2,343,586.89

APPENDIX XII

Fees

A. Professional

B. Actual

Project: Cobbs Creek Community Environmental Education Center
Client: CCCEEC/Mrs. Williams
Date: May 26, 2000

		Fall	Winter	Spring	Total Hrs.		Rate		Cost
Knapp	**Bruce**								
	Group Meeting	6.5	20	16	42.5	$	65.00	$	2,762.50
	Advisor Meeting	4	6	7	17	$	65.00	$	1,105.00
	Client Meeting	2			2	$	65.00	$	130.00
	Other Meeting				0	$	65.00	$	-
	Site Visit	4	2		6	$	65.00	$	390.00
	CADD		10	15	25	$	65.00	$	1,625.00
	Proposal	13.5			13.5	$	65.00	$	877.50
	Word Processing		2	6	8	$	65.00	$	520.00
	Research	12.5		3	15.5	$	65.00	$	1,007.50
	Correspondence/phone				0	$	65.00	$	-
	Presentation	7.5	6	8	21.5	$	65.00	$	1,397.50
	Progress Report		10		10	$	65.00	$	650.00
	Final Report			10	10	$	65.00	$	650.00
	Design		20	15	35	$	65.00	$	2,275.00
	Calculations		10	10	20	$	65.00	$	1,300.00
	Miscellaneous			10	10	$	65.00	$	650.00
	Total	50	86	100	236				$ 15,340.00
Koch	**Alyssa**								
	Group Meeting	5.5	20	16	41.5	$	65.00	$	2,697.50
	Advisor Meeting	4	6	7	17	$	65.00	$	1,105.00
	Client Meeting	2			2	$	65.00	$	130.00
	Other Meeting		2		2	$	65.00	$	130.00
	Site Visit	2	2	2	6	$	65.00	$	390.00
	CADD		15	60	75	$	65.00	$	4,875.00
	Proposal	18			18	$	65.00	$	1,170.00
	Word Processing	6	10	30	46	$	65.00	$	2,990.00
	Research				0	$	65.00	$	-
	Correspondence/phone				0	$	65.00	$	-
	Presentation	7.5	5	5	17.5	$	65.00	$	1,137.50
	Progress Report		15		15	$	65.00	$	975.00
	Final Report			30	30	$	65.00	$	1,950.00
	Design	1	2	10	13	$	65.00	$	845.00
	Calculations				0	$	65.00	$	-
	Miscellaneous				0	$	65.00	$	-
	Total	46	77	160	283				$ 18,395.00
Springer	**Brad**								
	Group Meeting	6.5	20	16	42.5	$	65.00	$	2,762.50
	Advisor Meeting	4	6	7	17	$	65.00	$	1,105.00
	Client Meeting	2			2	$	65.00	$	130.00
	Other Meeting		2		2	$	65.00	$	130.00
	Site Visit	2	2	2	6	$	65.00	$	390.00
	CADD				0	$	65.00	$	-
	Proposal	15			15	$	65.00	$	975.00
	Word Processing		5		5	$	65.00	$	325.00

	Research	6.5		4	10.5	$	65.00	$ 682.50
	Correspondence/phone				0	$	65.00	$ -
	Presentation	8	8	8	24	$	65.00	$ 1,560.00
	Progress Report		10		10	$	65.00	$ 650.00
	Final Report			20	20	$	65.00	$ 1,300.00
	Design		18	35	53	$	65.00	$ 3,445.00
	Calculations		10	25	35	$	65.00	$ 2,275.00
	Miscellaneous		10		10	$	65.00	$ 650.00
	Total	44	91	117	252			$ 16,380.00
Upham	**Kim**							
	Group Meeting	4.5	20	16	40.5	$	65.00	$ 2,632.50
	Advisor Meeting	3	6	7	16	$	65.00	$ 1,040.00
	Client Meeting	2			2	$	65.00	$ 130.00
	Other Meeting				0	$	65.00	$ -
	Site Visit	4	2		6	$	65.00	$ 390.00
	CADD	3	25	5	33	$	65.00	$ 2,145.00
	Proposal	10			10	$	65.00	$ 650.00
	Word Processing		4		4	$	65.00	$ 260.00
	Research	6.5			6.5	$	65.00	$ 422.50
	Correspondence/phone				0	$	65.00	$ -
	Presentation	13	8	10	31	$	65.00	$ 2,015.00
	Progress Report		20		20	$	65.00	$ 1,300.00
	Final Report			20	20	$	65.00	$ 1,300.00
	Design		20	60	80	$	65.00	$ 5,200.00
	Calculations		15	20	35	$	65.00	$ 2,275.00
	Miscellaneous				0	$	65.00	$ -
	Total	46	120	138	304			$ 19,760.00

Summary			
Knapp	Bruce		**$ 15,340.00**
Koch	Alyssa		$ 18,395.00
Springer	Brad		$ 16,380.00
Upham	Kim		$ 19,760.00
		Total	$ 69,875.00

Activity Summary	Fall	Winter	Spring	Total		Cost
Group Meeting	23	80	64	167	$	10,855.00
Advisor Meeting	15	24	28	67	$	4,355.00
Client Meeting	8	0	0	8	$	520.00
Other Meeting	0	4	0	4	$	260.00
Site Visit	12	8	4	24	$	1,560.00
CADD	3	50	80	133	$	8,645.00
Proposal	56.5	0	0	56.5	$	3,672.50
Word Processing	6	21	36	63	$	4,095.00
Research	25.5	0	7	32.5	$	2,112.50
Correspondence/phone	0	0	0	0	$	-
Presentation	36	27	31	94	$	6,110.00
Progress Report	0	55	0	55	$	3,575.00
Final Report	0	0	80	80	$	5,200.00
Design	1	60	120	181	$	11,765.00
Calculations	0	35	55	90	$	5,850.00
Miscellaneous	0	10	10	20	$	1,300.00
Total	186	374	515	1075	$	69,875.00

Appendix XII.B
Actual Cost

Project: Cobbs Creek Community Environmental Education Center
Client: CCCEEC/Mrs. Williams
Date: May 26, 2000

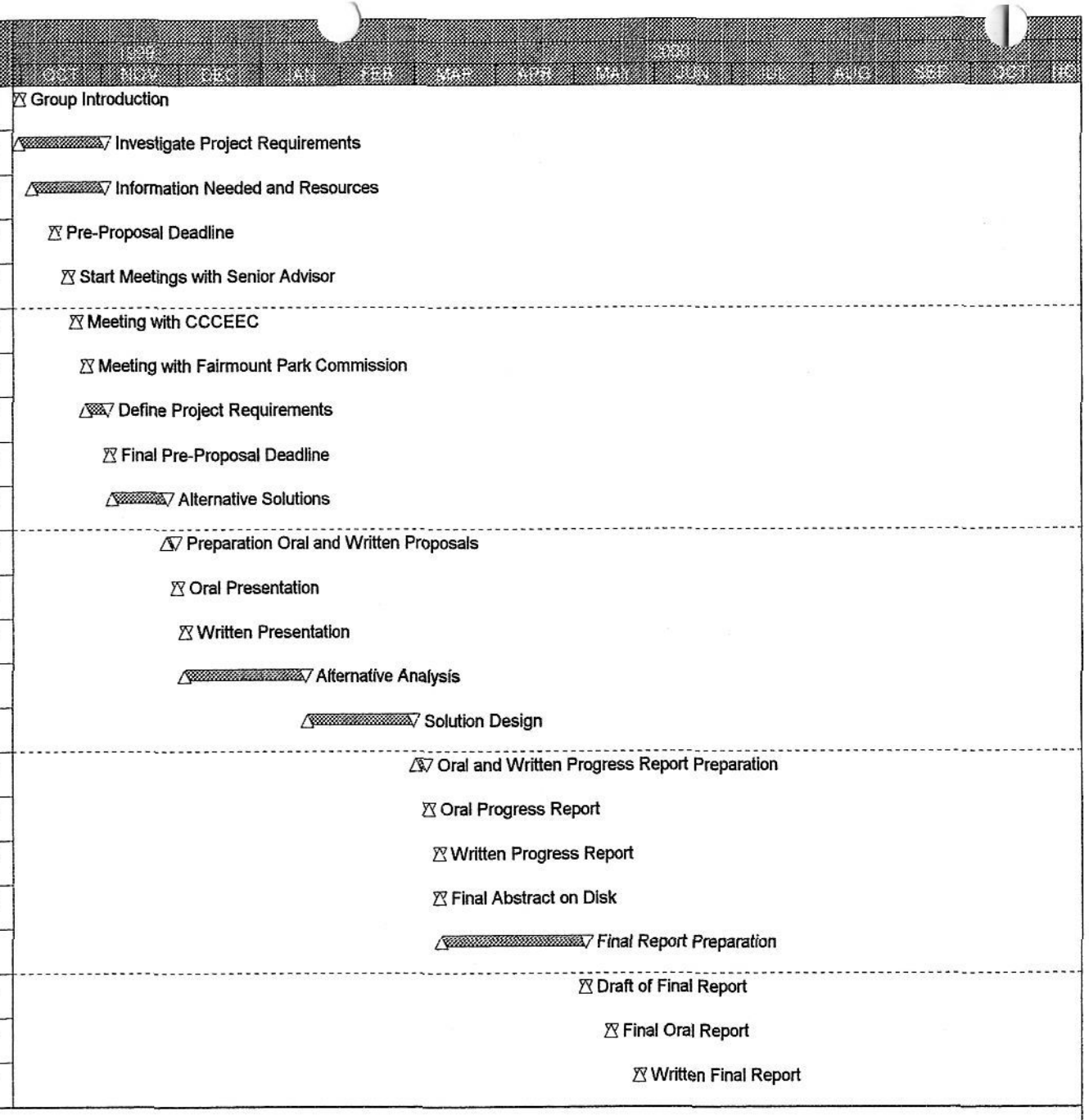
Fall	
Copying and Binding	$ 30.00
Copies of pictures	$ 20.00
USGS Map	$ 30.00
Film	$ 10.00
Winter	
Copying	$ 15.00
Binders	$ 6.00
Ink cartridges	$ 60.00
Spring	
Copying	$ 50.00
Binders	$ 20.00
Plots	$ 20.00
Ink cartridges	$ 60.00
	$ 321.00

The cost of this project is greatly minimized since we tried to do a lot of the printing ourselves. If we had large drawings of CAD, the cost would have greatly increased.

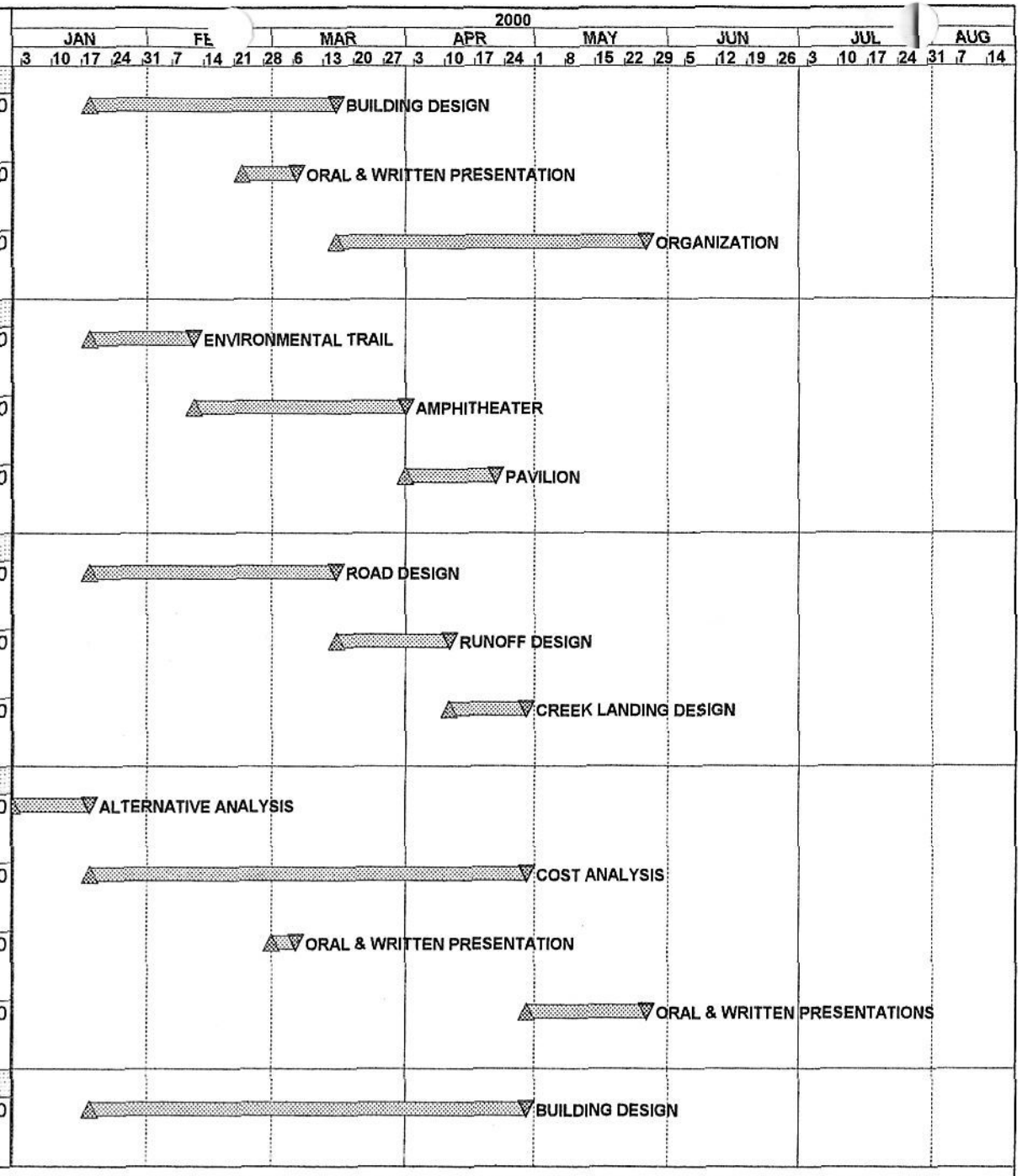
APPENDIX XIII

Schedule

Description	Orig. Dur.	Actual Start	Actual Finish
Group Introduction	1d	30SEP99	30SEP99
Investigate Project	1d	30SEP99	02NOV99
Information Needed and	1d	05OCT99	02NOV99
Pre-Proposal Deadline	1d	14OCT99	14OCT99
Start Meetings with Senior	1d	19OCT99	19OCT99
Meeting with CCCEEC	1d	22OCT99	22OCT99
Meeting with Fairmount Park	1d	26OCT99	26OCT99
Define Project Requirements	1d	26OCT99	03NOV99
Final Pre-Proposal Deadline	1d	04NOV99	04NOV99
Alternative Solutions	18d	05NOV99	26NOV99
Preparation Oral and Written	4d	26NOV99	29NOV99
Oral Presentation	1d	30NOV99	30NOV99
Written Presentation	1d	03DEC99	03DEC99
Alternative Analysis	47d	03DEC99	18JAN00
Solution Design	40d	19JAN00	29FEB00
Oral and Written Progress	5d	01MAR00	05MAR00
Oral Progress Report	1d	06MAR00	06MAR00
Written Progress Report	1d	10MAR00	10MAR00
Final Abstract on Disk	1d	10MAR00	10MAR00
Final Report Preparation	56d	11MAR00	05MAY00
Draft of Final Report	1d	05MAY00	05MAY00
Final Oral Report	1d	15MAY00	15MAY00
Written Final Report	1d	26MAY00	26MAY00



A Desc...tion	RESP	Actual Start	Actual Finish	%
ALYSSA KOCH				
BUILDING DESIGN	A.K.	19JAN00	15MAR00	100
ORAL & WRITTEN PRESENTATION	A.K.	23FEB00	06MAR00	100
ORGANIZATION	A.K.	16MAR00	26MAY00	100
BRUCE KNAPP				
ENVIRONMENTAL TRAIL	B.K.	19JAN00	11FEB00	100
AMPHITHEATER	B.K.	12FEB00	31MAR00	100
PAVILION	B.K.	01APR00	21APR00	100
BRAD SPRINGER				
ROAD DESIGN	B.S.	19JAN00	15MAR00	100
RUNOFF DESIGN	B.S.	16MAR00	10APR00	100
CREEK LANDING DESIGN	B.S.	11APR00	28APR00	100
GROUP				
ALTERNATIVE ANALYSIS	GRP	01JAN00	18JAN00	100
COST ANALYSIS	GRP	19JAN00	28APR00	100
ORAL & WRITTEN PRESENTATION	GRP	01MAR00	06MAR00	100
ORAL & WRITTEN PRESENTATIONS	GRP	29APR00	26MAY00	100
KIM UPHAM				
BUILDING DESIGN	K.U.	19JAN00	28APR00	100



Project Start 01JAN00
Project Finish
Data Date 01JAN00
Run Date 14FEB00

Early Bar
Float Bar
Progress Bar
Critical Activity

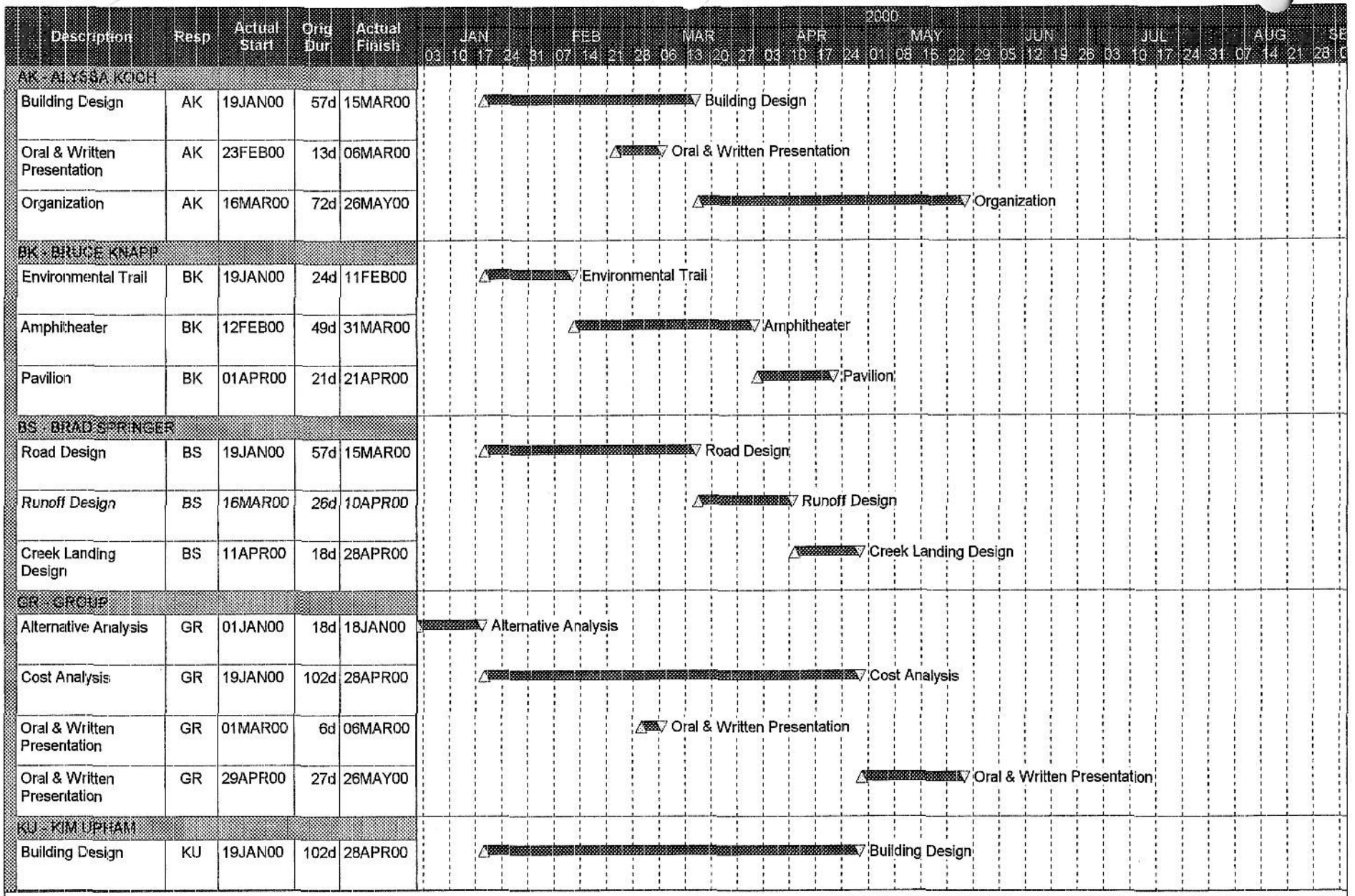
SEND

Sheet 1 of 1

KABB ASSOCIATES

Senior Design Winter Spring Schedule

Classic Schedule Layout



Description	Resp	Actual Start	Orig Dur	Actual Finish
AK - ALYSSA KOCH				
Building Design	AK	19JAN00	57d	15MAR00
Oral & Written Presentation	AK	23FEB00	13d	06MAR00
Organization	AK	16MAR00	72d	26MAY00
BK - BRUCE KNAPP				
Environmental Trail	BK	19JAN00	24d	11FEB00
Amphitheater	BK	12FEB00	49d	31MAR00
Pavilion	BK	01APR00	21d	21APR00
BS - BRAD SPRINGER				
Road Design	BS	19JAN00	57d	15MAR00
Runoff Design	BS	16MAR00	*26d*	*10APR00*
Creek Landing Design	BS	11APR00	18d	28APR00
GR - GROUP				
Alternative Analysis	GR	01JAN00	18d	18JAN00
Cost Analysis	GR	19JAN00	102d	28APR00
Oral & Written Presentation	GR	01MAR00	6d	06MAR00
Oral & Written Presentation	GR	29APR00	27d	26MAY00
KU - KIM UPHAM				
Building Design	KU	19JAN00	102d	28APR00

Start date	01JAN00
Finish date	01JAN00

KABB ASSOCIATES
CCCEEC

- Early start point
- Early finish point
- Early bar
- Late finish point
- Total float bar
- Progress bar
- Critical bar
- Summary bar
- Progress point
- Critical point
- Summary point
- Start milestone point
- Finish milestone point

This report has been brought to you by:

the gopher, the letters K,A, and B and the number 8.*

*Sesame Street